

FOUNDED, 1904

The Far Eastern Review

ENGINEERING + FINANCE + COMMERCE

THE PIONEER IN ITS FIELD

A Monthly Review of Far Eastern Trade, Finance and Engineering, Dedicated to the Industrial Development and Advancement of Trade in Far Eastern Countries.

HEAD OFFICE: 5 JINKEE ROAD - - - - - SHANGHAI, CHINA.

George Bronson Rea, *Publisher*

Carroll Lunt, *Editor*

JAPAN OFFICE:

PENDING THE OPENING OF OUR PERMANENT OFFICE IN TOKYO, ALL CORRESPONDENCE SHOULD BE DIRECTED TO 151, B, BLUFF, YOKOHAMA

NEW YORK OFFICE: 50 Church Street.
Nathaniel Ewing, *Representative.*

PACIFIC COAST OFFICE: 614 Syndicate Building, Oakland, Calif.
W. C. Rea, *Representative.*

MANILA OFFICE: Fleming, Percy Smith and Seth,
Roxas Building, Escolta.

GREAT BRITAIN: Walter Judd, Ltd., 97 Gresham Street Bank,
London, E.C.

VOL. XVII

JULY, 1921

NO. 7

CONTENTS:

	PAGE		PAGE
AN AMERICAN SOLUTION TO JAPAN'S PROBLEM ...	419	EDITORIALS:	
THE PROBLEM OF THE RACES ...	420	The Anglo-Japanese Alliance ...	456
The Yellow River Bridge ...	*425	Dangerous Propaganda ...	457
KELANTAN AND ITS NATURAL RESOURCES ...	*426	Profits in the China Trade ...	458
Motor Coaches for the Kowloon-Canton Railway ...	*431	The Right Spirit ...	458
MADRAS HARBOR WORKS ...	*432	A Russian Warning ...	459
SOME NEW STEAMER LAUNCHINGS IN CHINA ...	*435	The Press Congress of the World ...	459
JAPANESE BUILDERS OF RAILWAY ROLLING STOCK ...	*437	AN APPEAL TO THE DEAF ...	*460
MINING IN THE NETHERLANDS EAST INDIES ...	*442	PERMANENT CHINESE FAMINE RELIEF ...	*461
Manchuria and Seattle ...	446	JAPAN'S NEW PARLIAMENT BUILDING ...	*462
Prices Collapse in the Far East ...	446	ELECTRICAL OPPORTUNITIES IN INDO-CHINE ...	*463
IRRIGATION IN THE PHILIPPINES ...	*447	Harbor Work at Chefoo Progresses Steadily ...	464
Krupps to Build Steel Works in Chile ...	450	Wallace Cured Sick Steel ...	464
"Japanophobia" ...	450	THE MINES AND MINERALS OF YUNNAN ...	*465
THE ROCKEFELLER FOUNDATION IN PEKING ...	*451	THE ELECTRIC SHIP ...	*470
THE JAPANESE BILL MARKET ...	*452	THE HIDACHI COPPER SMELTER ...	*475
British Locomotives for the S. N. R. ...	*455	THE NEW SERUM LABORATORY AT ALABANG ...	*477
World Demand for Locomotives ...	455	JAPAN'S IRON AND STEEL INDUSTRY ...	*478
		HYDRO-ELECTRIC PLANTS IN JAPAN ...	*481
		THE PHILIPPINE RAILWAY, 1920 ...	*483
		The Yellow River Bridge Tenders ...	483
		FAR EASTERN IRON AND STEEL ...	484
		ENGINEERING, FINANCIAL, INDUSTRIAL AND COMMERCIAL NEWS ...	485

*Illustrated with Maps or Photographs

Entered at the U.S. Postal Agency, Shanghai, China, as second-class matter. Registered at the Chinese Post Office as a Newspaper. Entered at the Japanese Post Office as a Newspaper.

Sino-North American Co., Ltd.

Head Office: MONTREAL, CANADA

New York Office: 1330-1336 WOOLWORTH BUILDING

IMPORTERS, EXPORTERS,
ENGINEERS & CONTRACTORS

BRANCHES and AGENCIES

San Francisco, California; Cincinnati, Ohio; Vancouver, B.C.;
Calcutta, India; Shanghai, China; Kobe, Japan; Vladivostok, Siberia

Cable Address: SINAM, NEW YORK

G. M. GEST, Managing Director

ALPHABETICAL LIST OF ADVERTISERS

Admiral Line, The	41	Dorman Long & Co., Ltd.	3	Kanegafuchi Spinning Co., Ltd.	10	Royal Bank of Canada	64
Allen & Co., Ltd., Edgar	33	Drysdale & Co., Ltd.	52	Kawasaki Dockyard Co., Ltd.	35, 487	Ruston & Hornsby, Ltd.	7
Allen Everitt & Sons, Ltd.	2	East Asia Industrial Co.	60	Kokusai Kisen Kaisha	45	Ryerson & Son, Joseph T.	5
America-Japan-China Trust Co., Ltd.	64	Electricity Department, S. M. C.	6	Koster Co.	50	Sale & Frazar, Ltd.	16
American Locomotive Sales Corp.	25	English Electric Co., Ltd.	18	Kuhara Mining Co.	28	Scottish Tube Co., Ltd.	13
American Tool Works Co.	1	Evans & Sons (Wolverhampton), Ltd., Joseph	2	Lidgerwood Mfg. Co.	19	Shanghai Dock & Eng. Co., Ltd.	32
Arrol Johnstone.	31	Fairbanks, Morse & Co.	7	London Directory Co., Ltd.	4	Shanghai Municipal Council	6
Attwater & Sons	48	First National Bank of Boston	64	Lynd-Farquhar Co.	67	Shantung Railways	68
Avery, Ltd., W. & T.	11	Formosan Sugar Mfg. Co.	54	Manning, Maxwell & Moore, Inc.	17	Siebe Gorman & Co., Ltd.	17
Babeock & Wilcox, Ltd.	20	Fuji Gassed Spinning Co.	10	Mather and Platt, Ltd.	39	Simons & Co., Ltd., Wm.	13
Baldwin Locomotive Works	27	Gelder, G. van	41	McClintic-Marshall Products Co.	51	Sino-North American Co., Ltd. above Index	
Bank of Chosen	65	Gleniffer Motors, Ltd.	15	McConway and Torley Co.	15	South Manchuria Railway Co.	72, 74, 75
Bank of Communications	62	Green Island Cement Co., Ltd., The ..	8	Mitsubishi Bank	59	Standard Oil Co. of N. Y.	21
Banque de l'Indo-Chine	54	Greenfield Tap & Die Corp.	11	Mitsubishi Iron & Steel Co., Ltd.	38	Stewarts & Lloyds, Ltd.	67
Banque Industrielle de Chine	56	Halls Barton Ropery Co.	4	Mitsubishi Marine & Fire Ins. Co., Ltd.	52	Sumitomo	58
Bank of Taiwan, Ltd.	55	Hasler Telegraph Works	41	Mitsubishi Shoji Kaisha	66	Sumitomo Bank, Ltd.	58
Bayliss, Jones & Bayliss, Ltd.	15	Heap & Co., Ltd., Joshua	49	Mitsubishi Warehouse Co.	38	Texas Co., The	79
Berry & Co. Ltd., Henry	29	Hing Wah Paste Manufacturing Co.	77	Mitsubishi Zosen Kaisha, Ltd.	36	Thornycroft & Co., John I.	1
Betts Machine Co.	51	Hobson Manufacturing Co.	41	Mitsui Bank	59	Tokyo Electric Co.	77
Bliss Co., E. W.	73	Hongkong & Shanghai Banking Cor- poration	61	Mitsui Mining Co.	66	Toshin Soko	40
Brill Co., J. G.	39	Hongkong & Whampoa Dock Co., Ltd.	30	Mitsui Bussan Kaisha	26	Toyo Kisen Kaisha	43
British-American Tobacco Company (China), Ltd.	Cover	Imperial Japanese Government Rail- ways	70, 71	Mount Vernon Car Mfg. Co.	9	Trimont Manufacturing Co.	7
Bucyrus Company	9	Industrial Bank of Japan	63	Mustard & Co.	4	Turner, Halsey Co.	21
Burntisland Shipbuilding Co., Ltd.	19	International Banking Corporation ..	53	Nanyang Bros. Tobacco Co.	77	United Brassfounders Engrn., Ltd. ..	8
Butterfield & Swire	42	Iron City Products Co.	19	New Engineering & Shipbuilding Works	34	United States Steel Products Com- pany	23, Back Cover
Canada Carbide Co.	4	Ishikawajima Shipbuilding Co.	38	Niles-Bement-Pond Co.	6	Uruga Dock Co.	36
Chartered Bank of India, Australia & China	48	Japan Sugar Mfg. Co.	76	Nippon Yusen Kaisha	46, 47	Walker & Sons, Ltd., Wm.	8
Chicago Bridge & Iron Works	73	Jardine, Matheson & Co., Ltd.	12	Nobels Industries, Ltd.	22	Walworth International Co.	80
Consolidated Steel Corporation	14	Java Government Railways	69	North China Star	17	Werf Gusto	52
Craig & Donald, Ltd.	31	Jones & Lamson Machine Co.	49	Okura & Co. (Trading) Ltd.	24	Westinghouse Electric Co.	78
Dai-Ichi Ginko	60	Jugo Ginko	61	Osaka Shosen Kaisha	44	Whittall & Co., Ltd., J.	9
Dai Nippon Brewery Co.	77			Parker Co., Charles	73	Wild & Co., M. B.	37
Dennis Bros., Ltd.	Cover			Petroleum Products Co.	489	Williams & Co., J. H.	33
Diamond State Fibre Co.	21			Pittsburgh Steel Co.	52	Wireless Improvement Co.	489
Dixon Crucible Co., Joseph	80					Yarrow & Co., Ltd.	Cover
						Yokohama Dock Co.	37
						Yokohama Seiko Kaisha	20
						Yokohama Specie Bank, Ltd.	57

The Far Eastern Review

ENGINEERING

FINANCE

COMMERCE

Vol. XVII

SHANGHAI, JULY, 1921

No. 7

An American Solution to Japan's Problem

HERE appeared in the October, 1920, number of THE FAR EASTERN REVIEW, an exhaustive article on the racial problem in the Pacific, which, in brief, pointed to Japan's necessity of finding an outlet for her surplus millions. It advocated a new understanding between China and Japan supported by Great Britain, France and America, under whose terms China would be called upon to assume her share of the responsibility of assuring to her own and Japan's unborn millions the right to exist within lands set aside by nature as their peculiar habitat. We pointed out that Russia has annexed the waste lands and snuffed out the independence of the "little peoples of Asia," in order to gratify the Romanoff lust of conquest, and, in pursuit of her basic "Monroe Doctrine," excluded the Asiatic from his birthright. This policy resulted in prodding the yellow man over the sea to find an outlet, thus creating the racial issue in Canada, America, New Zealand, Australia, South Africa and elsewhere. As long as Russia retains possession of these Asiatic Alsace Lorraines and applies her policy of exclusion, the Japanese must perforce seek their future over the sea. We see no good reason why the youth of America and the British Dominions should be called upon to settle this issue in the Pacific in order to consolidate Russia's sway over vast territories in Asia stolen from the yellow man and now urgently required for his expansion. Some nation must sooner or later face this question. We see no reason why it should be America. Americans have no business in Siberia or in Manchuria or in Mongolia. We agree with the *Boston Transcript* in that "American economic flirtation with the resources of Siberia, while Alaska lies undeveloped at our doors, seems to be decidedly a case of the fields being green that are far away." Russia has no urgent need for these territories. Such development as she has carried out in these regions has been based upon purely strategical grounds, to provide facilities for further conquests. The time is not far away when the world must face the consequences. If Russian policy prevails, if the United States, in addition to maintaining the Monroe Doctrine, is to gratuitously assume the burdens of a Central Asian policeman in order to preserve Russia's hold over Eastern Asia, then the American people must prepare to throw aside their pacific traditions and embark upon the greatest military program the world has ever seen. Make no mistake about this. Unless the Asiatic is permitted to exist in Asia, then, sooner or later, he will be forced over the seas, and the youth of America will pay the price for the sentimental idealism of present-day leaders.

Since writing the above article, many prominent American editors have arrived at the same sensible conclusion, and while it is perhaps too early to state that American opinion as a whole is in favor of such a solution, there are signs that the time is not far distant when the vast majority of Americans will be convinced of its wisdom. For some years before his death, Roosevelt was the foremost contributor to the *Metropolitan Magazine*. It took the lead as the exponent of vigorous, red-blooded Americanism. Since his death, General Leonard Wood's two-fisted patriotic articles has kept alive the manly teachings of Roosevelt. When the editor of the *Metropolitan Magazine* takes a firm stand on any

vital national question, we may be sure that his views are not out of harmony with those of men like Leonard Wood and others of his type, who are once more directing American policies. Let us therefore give careful consideration to what the editor of the *Metropolitan Magazine* has to say in regard to Japan's right to exist:

"But—and it is a but of tremendous significance to Japan and indirectly to the world—the Japanese must have room in which to expand or lose their vigor as a people. Their natural outlet would seem to be in the unpopulated spaces of Asia."

"The editor of the *Metropolitan Magazine* makes a vigorous argument to this effect. He says, 'we must recognize Japan's need of expansion; that practically she has but one opening left and that on the continent of Asia and he concludes:

"Our policy should be to preserve the open door in these regions so far as possible, but not to interfere with Japanese expansion in Manchuria and Eastern Siberia. For unless we realize that prolific powerful races must expand into the empty spaces of the world, and unless we look at the map and see that Northeastern Asia is the only field left open to Japan, and unless we stop a policy of hindrance in that part of the world, we shall surely have to fight Japan. Our third point is that instead of a policy of interference in Asia we should ask England and Japan to forego the Anglo-Japanese Alliance and form a triple entente for the preservation of peace in Asia and the world."

The *Metropolitan Magazine* faithfully reflects the views set forth in the October number of THE FAR EASTERN REVIEW. As Japan cannot send her children to America or the British Dominions in the Pacific, she must send them into Asia. To preserve the peace of Asia, there should be some new instrument or understanding to take the place of the Anglo-Japanese Alliance, that will guarantee to the yellow race their right to live and expand within the limits of their traditional civilization.

We may now read what the editor of the *American Review of Reviews* has to say on the same matter:

"Trouble between Japan and the United States is both needless and absurd. It could only come through misunderstanding begot by mutual jealousy and suspicion.' He suggests that Americans 'should study Japan's problems, and help her to solve them on sound principles.'

"What is the fundamental problem of Japan? It arises of her growing population and her smallest fertile acreage relative to area of any civilized land. The Japanese must simply have more ground to stand on. And the editor of the *Review of Reviews* would give it to them in Russia. 'The United States better than any other power could propose that the disposition of East Siberia should be considered, so as to permit Japan to put its case before a fair commission. No European power has any right to seize all Northeastern Asia and keep it in escrow when teeming millions seek it. The yellow race needs space.'

"Concerning the Russian claim over Northeastern Asia, we are told that—'A mere occupation, as one of the incidents of war, should not be made a basis for conquest anywhere without consideration by the great powers to-day responsible for the world's

governance and new titles; but why should not Japan receive a region close to it, uninhabited, in all, Arctic and temperate, 1,000,000 square miles, which Japan can improve better and make useful to the world quicker than any other land? Japan and China have a fair right to waste and open land whose ownership Russia has used only to exclude others—in one case with extreme barbarity.”

Accordingly, the *Review of Reviews* believes that “no better policy exists to-day than to give East Asia from the Arctic down to the China Sea to the various peoples of the yellow race and in end the line may be drawn at Torres Strait.”

The editor of the *Reviews of Reviews* also faithfully reflects the views presented by THE FAR EASTERN REVIEW and endorses the appeal made in our March number for a Pacific conference in which the cards can be placed on the table by all concerned in preserving the peace of Asia.

And then read what the *San Francisco Chronicle* has to say:

“The proper outlet for the Japanese surplus population is into the unoccupied areas of Asia. There is plenty of room and no racial antagonism, but the work is pioneering.

“Nothing prevents the Japanese from going anywhere in Asia, where there is abundant room for the exercise of their industry and thrift. There is, however, objection to the apparent theory of the Japanese that wherever in Asia they wish to go the Japanese must run the country, with no non-Japanese allowed on the premises. If the Japanese will emigrate into China, Mongolia or elsewhere and become real citizens of the country, all Asia is open to them, and it is much nearer than this country.”

We might lengthen this out indefinitely by extracts from other American editorials. When such prominent American editors agree in principle as to the proper solution of this problem, it may be taken for granted that the time must arrive when the rest of the country will see things in the same light. If we are to have peace in the world the question of where the surplus millions of Asia are to go to, must receive careful and immediate consideration from those who have the power to bring about a solution while there is time.

G. B. R.

THE PROBLEM OF THE RACES

By George Bronson Rea

“IT HAS BEEN ESTIMATED THAT THE EARTH CAN MAINTAIN A POPULATION OF 6,000,000,000, A TOTAL WHICH WILL BE REACHED ABOUT A.D. 2100.—*Whittaker's Almanack.*”

“THE EARTH CAN SUPPORT A POPULATION OF 2,200,000,000 LIVING ACCORDING TO THE AMERICAN STANDARDS OF LIFE, OR 5,600,000,000 ACCORDING TO GERMAN STANDARDS, BUT IF ALL THE PEOPLES OF THE WORLD SHOULD LIVE ACCORDING TO THE JAPANESE STANDARDS, OLD MOTHER EARTH COULD EASILY SUPPORT A POPULATION OF 22,400,000,000. . IN 150 YEARS, AT THE PRESENT RATE OF INCREASE, THE POPULATION OF THE EARTH WILL BE TEN BILLION.”—*Report of the Japanese Sociological Society (1915).*

NOTE.—The main facts and argument in this article formed the basis of a special intelligence report prepared for and at the request of the American military authorities in France in November, 1917. The vital truths herein outlined undoubtedly helped to influence the highest American military officer in France to advise President Wilson against sending an American army to Siberia. I have been requested to revise the report and bring the relation between the German and Japanese population problem up-to-date. This I have done, and present herewith the result of this study. My prophecies concerning Germany's post-bellum commercial and emigration policies are being carried out exactly as I foretold. The situation in Japan is rapidly developing along the same lines. The problem herein outlined overshadows all others. It is not only the problem of Japan, but of China. Inattention to the working of these forces resulted in the explosion of 1914. The facts surrounding the rapid increase of Far Eastern peoples warns us that we must open the blow-off, get off the safety-valve and permit the pressure to escape into channels where it will operate for the benefit of the whole world, or, continue to squat and invite the next catastrophe.—G.B.R.

WHAT nations or peoples are to control the fair places of the earth? In the struggle for existence, for the right to live, to procreate, and be happy, that our grandchildren must face, will the smaller and weaker nations be permitted a place in the sun under their own flag and institutions? This is the real problem of the world, the issue that should have been faced at Paris in the Peace Conference.

Ponder over the figures at the head of this article. Analyze them. Study them. Which is right; the estimate of the white statistician or that of his equally learned yellow brother?

It is not my intention to delve into intricate statistical details. The high points must be sufficient for the purpose of this argument. According to Mulhall, the population of the earth has doubled in the last eighty years. The population of the earth at the present time may be placed at 1,700,000,000. In eighty years (2,000) it will reach 3,400,000,000, in another eighty years (2,800) it will be 6,800,000,000.

With slight variations the average European nation (Russia excluded) is doubling its numbers in about eighty years. The figures vary. In his “Elements of Vital Statistics,” Dr. Newsholme sets out at length the annual increase of a large number of countries. The period under his review, 1891 to 1895, showed a doubling of the population of Prussia in 49 years, in England in 59 years, Italy in 67 years, Austria in 74, and of France with her exceptional birthrate, in 591 years. Russian statistics indicate a doubling of the population in 50 years. This rate of increase is achieved without any undue strain on the older countries from which the stream of emigration flows to populate the new lands of the earth. With the aid of this surplus, the United States is also doubling its numbers in about 50 years.

Dealing with this same problem in western Europe, and excluding Russia and the Balkans, Mr. Longstaff in his “Studies in Statistics,” reaches the conclusion that in the period under review (1861-1891) the increase was at the rate of 21 per cent., or

6.6 per cent. in each decade. If the population continued to increase at the same rate as from 1850 to 1880, it would arrive in 1990 at close on 455,000,000. This study reveals that the population of western Europe is doubling in 66 years. If Russia, with its 175,000,000 people doubling in 50 years be included in the study, the general European average would be 58 years, without taking into account the drains from emigration.

As long as there exist fair places under the sun where the European can emigrate to, the problem of the increase will remain more or less academic to their governments.

What was the situation when the great war broke out? "The Italian laborer was overrunning the globe becoming the rival of the American in New York, of the French in Provence, in Lorraine and in Paris. The Argentine is almost an Italian colony. The Germans and Swiss were colonizing Paris, the east of France, London and South America. The Pole was found on both sides of the Vosges. The Scandinavian, the Russian Jew, the Hungarian, and the peoples of southeast Europe were elbowing the native born of every country." From the vast spawning grounds of eastern and southeastern Europe millions have overflowed into the waste spaces of America. And still they come, stronger and more determined than ever, crowding into the narrow confines of city districts and undermining our institutions. The Hindoos were knocking at the doors of British Columbia and other fair places in the empire of which their land is the corner-stone. The yellow man was seeking his opportunity in the lands of the Pacific paradise, but the doors were closed to him.

The Japanese have no outlet. They are increasing at the rate of about 700,000 a year and with no place to go. The doors of the fair places of the world held by the white man are closed to them. They have been denied the right to cross the seas. The internal pressure has, therefore, forced them to study their problem and find a solution. They have made careful investigations, and, as a result, their learned professors estimate that by A.D. 2070 (150 years hence) the population of the earth will exceed TEN BILLION. This is four billion more than Whittaker's estimate. The discrepancy would indicate that the Japanese savants base their findings on data not accessible to or understood by the Western student. Why this great divergence in opinion?

The great difficulty facing Western investigators in arriving at a reliable estimate of the increase of the human family, has been the notorious lack of statistics concerning the Mongolian and Asiatic races. The peoples of Asia comprise one-half of the world's population. They belong to a different civilization, holding diametrically opposite views to the West on the question of marriage and the birthrate. Therefore we cannot apply the same rules in estimating their increase as we do in Europe or America. It is only by understanding Oriental conditions that we may grasp what lies behind the prophetic estimate of the Japanese experts.

Restricted by our laws, religions, customs, respect for women and the necessity of taking care of and educating our children, the peoples of the West require an average of eighty years to double their numbers. In France, the population is dying out. This tendency is also seen in the birthrate of the upper classes of England and the United States.

In Asia we find different conditions. The standards upon which our Western civilization are based, crumble away and disappear as we cross over into the older continent. We find lands where polygamy, concubinage and female slavery prevail. Woman descends from her high pedestal of the West and becomes the plaything of the male; the breeder of children. In China we

find yet another civilization based upon ancestor worship, obligating perpetuation of the male line to perform the sacrifices at the shrines of departed ancestors. What effect has this on the birthrate and increase? Here is where the Western investigator is baffled through the absence of statistics. Japanese statistics of the native Chinese population in Formosa show that the latter are doubling their numbers in 33 years; in the Kwangtung Leased Territory, in 31 years. The full effect of Oriental civilization on the rate of increase is seen in Korea, where statistics of the native population indicates a doubling of the numbers in 27 years—six times as rapidly as the white man.

There are no reliable statistics covering China. We can only hazard a comparison with the Japanese statistics quoted above. A study based on available Chinese data is most unsatisfactory. For instance, in 1851, the population was put at 432 millions. In 1861, it was stated to have fallen to 261 millions, due, in part, to the terrible massacres of the Taiping rebellion, which in ten years destroyed over 90 millions. Although estimates vary, yet it can be accepted that the present population is rather over than under 400,000,000. It is estimated that 4,000,000 people die annually in China from starvation and purely preventable causes, such as floods, famine, cholera, plague, etc., without including deaths from internal disorders, rebellions and bandit forays. One per cent., or almost the average increase of Western peoples, is annually destroyed in China. Yet the Chinese increase.

With the construction of railways, conservation of rivers, installation of modern sanitary and water systems, hygiene, a stable government and other reforms, the greater part of this waste will be eliminated and then the full effect of the Chinese birthrate will be felt. It is fair to assume that this increase is about the same as it is in Formosa and Kwangtung. It is also believable that in some sections of China the increase reaches the same alarming figure as in Korea. It is therefore permissible to take forty years as the time required for doubling the numbers of China, but for the purposes of this study it can be placed at fifty, or, about the same as Japan, Russia, the United States, etc.

There are 400 million Chinese and 70 million Japanese. With their co-religionists in Indo-China, Siam, Java and elsewhere (outside of India), holding the same viewpoint, the total will be about 500,000,000. We can leave the 350 million Hindoos out of the question for the moment. If the white or non-Asiatic population of the world, numbering 800,000,000, are doubling their numbers in 80 years, there will be approximately 3,200,000,000 in 160 years. If the 500,000,000 yellow men are doubling their numbers in 50 years, they will number 4,000,000,000 in 150 years, or if we take the doubling of the population at 40 years, they will number 8,000,000,000 in 160 years.

There are 350,000,000 Hindoos in the Asiatic family, adhering to more or less the same viewpoint on marriage and the birthrate as the Chinese and other Buddhistic peoples. The death rate is, however, nearly equal to the births. Plague, cholera, famine, floods, and other decimating visitations of sickness keep down the increase. But with modern improvements, sanitation, etc., the rate of increase will steadily climb up in the next quarter century. The Hindoos will then demand their place in the sun, under the flag of the British empire. All the might of Great Britain cannot forever keep these people within a ringed enclosure. *Africa will become the America of the Hindoo.* It is well to bear this fact in mind.

We can now begin to understand that the estimate of the Japanese Sociological Society, is based upon the difference in the time required for the white and the yellow man to double his numbers.

IN THE NEXT TWENTY-FIVE YEARS—
WITHIN OUR LIFE TIME—JAPAN MUST FIND
ROOM FOR AT LEAST TWENTY-FIVE MILLION
NEW PEOPLE. IN THE SAME LENGTH OF
TIME, CHINA WILL ADD ANOTHER TWO
HUNDRED MILLION TO HER POPULATION.
RUSSIA WILL REQUIRE ROOM FOR 87,000,000
MORE.

WHERE WILL JAPAN FIND ROOM FOR
HER SURPLUS?

WHERE WILL THE CHINESE EXPAND?

In an endeavor to throw light on this Asiatic problem and invite discussion, I wrote a series of articles in 1915 which appeared in many American papers under the title of "Japan's Place in the Sun." I purposely refrained from further discussion of these problems at a time when Japan was our ally, honorably contributing her might towards the defeat of the common enemy. Conditions have changed since 1915. Germany is defeated. A League of Nations has been formed to settle the problems of the world. Japan has become one of the five great powers and is asking for her reward. On the surface, her claims have been confined to minor territorial matters, the Pacific isles and Kiaochau, but underneath, there remains the same tremendous problem, the cry for racial equality, for the right of her people to travel and reside in other countries of the earth on a plane of full equality with the scourings of Europe and the black man from Africa.

Japan is saying to her four great allies, "What places of the world are to be opened to my people? We prefer not to go into China or other parts of Asia; we cannot compete with our Asiatic brethren on the mainland. Will you concede my people a place in the sun; will you permit us to take our place on a plane of equality with the rest of humanity by whose side we have fought; will you accept us as equals in peace as you did in war; or, because our skins are yellow, because our civilization is different; will you compel us to absorb our increase of population within the narrow and congested confines of our island empire?" This is the problem of Japan; the voice of Asia echoing across the seas to the conference table at Geneva. On its honorable solution depends whether our sons or grand-sons are to wage another and more terrible struggle for the right to exist. And, mark it well. Four hundred million Chinese and three hundred and fifty million Hindoos are silently watching the ways of Western justice. They are waiting to hear what the answer of the nations will be to Japan, their spokesman.

In order to drive home what the future holds in the Pacific, it is necessary to invite attention to the operation of forces in Europe, which, in part, were responsible for the late conflict. It is, therefore, essential to scrutinize the facts as applied to Germany.

The picture revealed by the figures is clear. We see before us a comparatively small and congested empire whose population was increasing at the rate of 800,000 per year. It may be true that the increase was beginning to fall off, but the percentage was so small that it should not be permitted to cloud the essential truth. In connection with Austria, the Teutonic increase was over a million a year.

Germany had no colonies in temperate climes where her emigrants might remain under their own flag, preserve their national characteristics, habits of thought, *Kulture* with a big K, if you will, and retain their allegiance to the "Fatherland." Austria had no colonies. She gobbled up her smaller and weaker neighbors. It is true that Germany possessed colonies, which, under certain conditions, might be peopled, developed and exploited, but they could hardly be classed as fit homes for any self-respecting white man. The non-colonial policy of Bismarck deprived Germany of her opportunity to acquire suitable outlets for her surplus population, and, after his death when the craze for expansion became the keynote of the imperial program, all the fair places of the world had been pre-empted by other more far-sighted powers.

In the meanwhile, the Germanic peoples continued to increase. In the main, they remained at home. They developed a

great material civilization, and, in a few decades became a highly centralized, industrial and commercial nation. As their industries increased by leaps and bounds, foreign markets, a merchant marine and navy for its protection, became necessary. Had an outlet been provided, the explosion might have been averted, at least, delayed.

Deprived of an outlet in temperate climes under their own flag, the internal pressure in Germany followed the natural law governing the operation of such phenomena. The powers calmly squat on the safety-valve of the German steam boiler, congratulating themselves that they had the pressure under control. Something had to burst. It did.

Some writers deny the force of this statement, by proving to their satisfaction, that Germany was not over populated; that the birth-rate was steadily decreasing; that over 700,000 foreigners were imported annually to plant and harvest the crops and work the mines. This statement is true, but it cannot wipe out the fact that there was an annual increase of 800,000. Where did they go to?

The neighboring countries of Europe became German colonies. Instead of exporting labor, her commercial element was distributed throughout the world. France became a preferred German colony. There were more Germans in France at the outbreak of the war, than there were Frenchmen in the French colonies. Why? Look at the statistics and read aright the story of the figures. We see in France a nation whose population has remained stationary for almost a century. Yet this did not deter France from embarking upon an ambitious colonial policy. France had no pressing population problem to solve. Every Frenchman who emigrated to the colonies left a void in the commercial and industrial life of the mother country. Their places were filled by Germans, by Poles and Italians.

It is impossible to provide against such a contingency. The rich, prosperous, highly cultured state whose birthrate falls off to such an alarming extent as did that of France, becomes the outlet for a neighboring people whose procreative recklessness is indicated, as in the case of the Teutonic

nations, by an annual increase of nearly a million people.

Russia became a German commercial colony. German merchants and drummers were everywhere. Their political agents were found in all branches of the government service. Russia was, and still is, inoculated with the virus of German culture. German influence was felt in the highest court circles. It is now the moving spirit behind Bolshevism. To carry on such a scientific propaganda, required a high order of intelligence. The German laborer could never have succeeded. The story of Russia since the outbreak of the war furnishes conclusive evidence of how a neighboring state can ultimately be brought under the influence of a stronger, more astute or unscrupulous power, through the machinery of peaceful penetration, bribery in high places and the skilful use of propaganda amongst the masses. Russia blocked Germany's expansion to the East. The picture of present-day Russia is the result.

The story was true even in England. Germans were so firmly entrenched in the financial and commercial life of the empire, that it was difficult in many cases to ascertain where real British interests began and ended. The failure of the British government to exercise a controlling influence over foreign loans made it possible for Germany to utilize British credit and money for her commercial penetration into British markets, while employing her own resources to create a huge war machine.

IF WE BAR THE WAY TO THE EXPANSION OF A PROLIFIC PEOPLE THROUGH THE ACQUISITION OF COLONIES, WE MUST ADMIT THE OVERFLOW INTO OUR OWN NATIONAL AND ECONOMIC LIFE, THUS LOWERING OUR STANDARDS OF WAGES AND LIVING.

OR, IF WE ERECT BARRIERS AGAINST THEIR ENTRANCE, AND COMPEL THEM TO ABSORB THEIR OWN SURPLUS, WE INVITE ECONOMIC DISASTER THROUGH COMPETITION IN THE MARKETS OF THE WORLD WITH THEIR LOWER-PRICED PRODUCTS.

THE PRICE HAS TO BE PAID.

The United States had its own problems arising from the colonization of certain sections of the country exclusively by Germans. Argentine, Brazil and Chili were filled with German mercantile houses. Their influence in China was sufficient to delay for three years China's entrance into the war. They dominated Spain and the Scandinavian countries. In other words, the absence of colonies in tolerable climates, compelled the Germans to quietly diffuse themselves throughout the other countries of the world.

The indictment is brought against the Germans that they violated the hospitality of nations whose doors were opened to them. The indictment is just. Human nature being much the same the world over, can we honestly expect the German, any more than the American, the Briton, the Japanese or Chinese, to change his ideals, his allegiance and love for his country, when he changes his residence? Swayed by the passions engendered by the war, have we not asked something from the Germans that we would not tolerate ourselves? The Germans had no monopoly of the gentle art of peaceful penetration into the affairs of weaker nations; of creating interests to serve as the basis for future political dominion, or provoking incidents to justify armed intervention.

It is easy to ask that the German who makes his home in America, abide by its laws and conform to its ideals. It is also easy for the honest German to assimilate our mode of life and thought, and in time, become a good American. He is a long distance from the Fatherland and its influences. We cannot expect that the German who overflows into the neighboring states of continental Europe, at all times in touch with his Fatherland (only a few hours distant by train), can, or ever will, renounce his allegiance or forsake his ideals and conception of Germany's mission in the world.

As we look back over the events of the past two decades, we can see how this forced German colonization of France, Russia, Great Britain, Brazil, and other countries gave rise to suspicion, misgivings, unrest and finally hatred. As German trade and influence grew apace, invading the special fields of British and French manufacturers, underselling the products of all other countries, we saw the logical result in the intensification of national commercial rivalries, jealousies and animosities. Germany was capturing their trade even in their own colonial possessions and established markets. The other nations complained.

If we study the problem dispassionately, the question must arise, where else could the Germans find their outlet and opportunity? If France, Great Britain, Russia, and other countries were, to a large extent, preferred German colonies is it not traceable to the fact that these same powers were, in part, responsible for her failure to acquire suitable colonies of her own? One cannot have his cake and eat it too. The policy of the other powers compelled the Germans to diffuse their energies in the very states which opposed their expansion.

If the pre-war rate of increase in the population of Germany is maintained, may not the same peaceful penetration into other countries be resumed? Will not German interests again attempt to influence the politics of other countries for the furtherance of their own ends? In the development of postbellum commerce, will not German capital seek to escape the penalties imposed by the war indemnities, through investments in neutral countries where there is no crushing tax on profits? Will not Spain, and the South American countries become favored German commercial colonies? *Will not the Germans in some way or other seep back into the preserves of the allies? If Germany is prohibited from possessing colonies or room for expansion, will not the old process be followed out once more to its logical conclusion? Will not this policy again direct the flow of Germany's surplus population into allied territories, or into neutral countries where the creation of German industries must ultimately react upon the trade of the allies? Will we not have to pay the penalty in the long run?

The statement that the Germans had ceased to emigrate and were importing foreign labor for their fields and mines is emphasized by some writers as proof that Germany was not over-populated, and, therefore, had no need for colonies. But when the emigration statistics are cited in support of this statement, is it not reasonable to assume that the figures are confined to emigration by sea? It would be difficult and impracticable to keep an exact record of the thousands overflowing into the commercial life of neighboring nations using the network of continental railways as channels of travel.

If the Germans did not emigrate, what then became of the 800,000 annual increase? Obviously, they were absorbed by the creation and expansion of industries. This carried its corollary of new markets to dispose of the products. The industrial life of the nation became intensified. Now if we erect a ringed fence around a rapidly-increasing industrial people and compel them to absorb their own surplus population, we must expect their products to compete with ours in the markets of the world. In such a competition the advantage will go to the economically superior, to the people who face the greatest struggle for existence; to those who can live the cheapest and work for the lowest wages.

Analysis would seem to indicate there is no escape from the certain penalty of circumscribing the national expansion of a virile, industrial people. If we bar the way to their acquisition of colonies in tolerable climes, we must pay the price by admitting the surplus population into our own national and economic life, thus lowering our standards of wages and living. Or, on the other hand, if we erect barriers against their free entrance into neighboring countries and compel them to absorb their own surplus, we invite economic disaster through competition in the markets of the world with their lower priced products. The result seems to be the same. The highly centralized, over-populated industrial nation facing such a problem will have to be permitted to live. They will make a desperate struggle for existence.

Germany was the only great nation faced with the problem of a rapidly increasing population having no suitable outlet under their own flag. When the Briton feels crowded or the struggle for existence becomes too keen, he simply visits one of the many colonial bureaus and selects a new home in Canada, Australia, New Zealand or South Africa. He is assisted to reach there. He remains under the Union Jack and preserves his national characteristics. There is no pressing problem arising from a surplus population in the British Isles. The expansion of industries competes with the colonies for the supply of labor. The opportunities of the Briton are boundless.

France has no surplus population. Her problem is the other extreme; how to increase the birthrate and people her vast colonial empire and defend her home territory. When seeking for the causes underlying the great war, we cannot overlook the trait in the French people which permitted their population to remain stationary, when a next door enemy was doubling her numbers in sixty years. It opens a line of thought that should receive careful consideration in any equitable adjustment of world problems. It was the impelling argument used by Clemenceau to induce Wilson and Lloyd George to enter into a separate alliance for the defense of France. If a nation refrains from increasing, and the people of a neighboring state holds opposite views, and doubles their numbers in fifty years, has the former the right to retain control over vast expanses of the world's waste surface? If France with no surplus population, is to possess vast domains in Africa and other parts of the world, and the Germanic states with an annual increase of 800,000 are prohibited from enjoying an outlet under their own flag, will not the time arrive when the issue will be fought out anew?

With the doors of allied countries closed to them, the Germans must go somewhere. If they take a notion to concentrate on some Latin American state, Mexico, or Chili, must not the day arrive in the future when they will again create trouble? Suppose they select Spain and the Spanish zone in Morocco as a field for future colonization and commercial exploitation, and use this neutral

*Krupps have recently acquired huge iron properties in Chili, at a cost of \$10,000,000, on which to base the erection of steel works, designed to capture the South American markets.

territory as a base from which to stir up trouble amongst the Moors, can France or the allies intervene in the affairs of Spain and demand their expulsion?

Russia has no surplus population problem. She has land enough for her increasing millions for another century. Emigration from Russia is caused by a desire to escape from intolerable political conditions. In another half century, the population of Russia will number 350,000,000. Her land hunger under the old régime was insatiable. Slowly, but surely, the domains of Central Asia, were gobbled up. She was reaching out for Afghanistan with the ultimate idea of absorbing India. This advance on India was the reason for the Anglo-Japanese alliance. Chinese Turkestan, Mongolia, Manchuria, the Amursk, northern Persia and other corners of Asia were absorbed. She was stretching out her hand for Korea with the idea of subjugating Japan, when she met her first check. She was intriguing in Tibet to obtain a free road to India in this direction. The "Drang nach Osten" of the Teutons was a child's game compared with the "Way of the Bear." Had not the great war started in 1914, it is probable that Japan would have had to fight Russia once more for her independence. The only excuse for Russia's persistent land-grabbing policy was to drive her frontiers deep into Asia to prevent the pressure of the yellow races against the white man's frontier of the Urals. This, however, did not, and cannot, stop the increase of the Mongolian race. At its best, it could only retard for a few years the struggle for the right of the latter to live in the spheres where nature has placed them.

The United States has not had to face the problem of providing for a surplus population. There is still room enough for another century at the present rate of increase. But the great opportunities have gone. Italy, Spain and other countries are populating South America with their surplus. Germany and Japan are the only two powerful nations whose population increase causes their rulers to lay awake nights dreaming of outlets.

I might amplify this discussion to cover other phases of the situation in Germany arising from this rapid increase of population, but these matters have been clearly explained by many competent authorities within the past four years. My only desire is to emphasize the high points without carrying the argument to a stage where it might be construed as an attempt to justify Germany in precipitating the war.

It seems clear that there must have been some overpowering, compelling motive driving the Germans onward in the war. There was. They were told "they were battling for self-preservation, for the right to live, for the future of their children." An appeal was made to the first law of nature. "The door of equal opportunity was to be closed to them. The fair places of the world for others. Germany could have no colonies." The result is before us. If the first duty of a government is to provide for the present and future happiness and welfare of its people; will not a liberal or republican Germany, in the face of an ever-pressing population problem follow the same policy as the former autocratic régime? If we deprive them of arms or means of waging warfare, will not the struggle follow the lines of peaceful penetration, or colonization in weaker neutral states? There is no form of government, no laws, regulations, peace terms or solemn covenants, that can withstand the steadily increasing pressure of a rapidly expanding population.

The German people will continue to breed. They are now advocating polygamy, lateral marriages and placing a premium on child birth. Where will they go to? How will they live? As we try to answer this question, are we not following a vicious circle and return once more to pre-war conditions? If we erect a ringed fence around Germany, and the powers, now augmented by the United States, gleefully squat once more on the safety valve, and delude themselves that the danger is past, will not the same old story be repeated? Will not the neighboring countries of Europe again become German colonies? Are we foolish enough

to believe that the erection of a Chinese wall around Germany will prevent the reciprocal exchange of products or labor? The laborer will seep through and find a place to sell the products of his toil. The colonization of France, Britain and Russia will begin again where it left off. If the Germans continue to increase as in the past, and the French people diminish in numbers, will not the time arrive in another generation, when, figuratively speaking, the Germans will water their horses in the Atlantic Ocean?

No! thunders the French. Never! echoes the Briton. The Germans must and will be excluded. They must remain at home or overflow into some other country. They will be condemned to practice racial suicide or absorb their surplus within their own boundaries. Very well, let us accept this verdict. The struggle for existence will become intensified. If the Germanic peoples are to live and pay the great war indemnity, they must produce and sell their products abroad. As the struggle becomes keener and the pressure greater, German manufactured articles will under-sell those of all other countries in the *neutral* markets of the world. Or, the Germans will migrate to some other country away from the influence of the allies. This Land of Promise is to be Russia and Siberia. In the Altai mountains Germany expects to obtain possession of the mineral wealth which in time will permit her and Russia to dominate the world. So, no matter which way we look at the problem, the result seems to be the same. If they are to stay at home, they must be permitted the opportunity to manufacture products that will enable them to purchase the food to support their yearly increase. The keen struggle for existence will gain for them the control of foreign markets, unless penalized by superior force. In view of such a possibility, it is only human nature that they will do everything to circumvent these penalties by emigrating into regions where the allies may not interfere with their commercial or racial development. In this case, if they carry out their program to overflow into Russia and Siberia, some day they will gather enough strength to again test the endurance of the allies. In other words, we cannot stop the operation of nature's laws, and, if the Germans continue to multiply as in the past, the rest of the world must face their competition in trade, and when the time is again ripe, their hostility in arms. The penalty must be paid.

Squatting on Japan's Safety-Valve

Every argument that applied to Germany and Europe applies with ten times greater force to Japan and Asia. Japan is facing the same problem but with this immense difference. Whereas, the doors of all countries were wide open for the entrance of Germans, the portals of the great white nations of the Pacific are closed to the sons of Nippon. No Japanese need apply. As Germany's surplus had no suitable lands under their own flag to emigrate to and develop, she sent forth her merchants, her bankers, her drummers and educators, who labored day and night to create the vast markets that made possible the existence of those who remained in the Fatherland. With the doors of the great white nations of the Pacific barred against the entrance of her laborers and artisans; confronted with the impracticability of their emigrating to the mainland and competing with their Asiatic brethren, the Japanese laborer must remain at home. In order to exist, Japan must follow the example of Germany and send forth her merchants, and privileged classes to the uttermost ends of the earth to find markets for products that will enable her masses to eke out a miserable hand-to-mouth existence within their walled-up island empire. For this is exactly what Japanese exclusion in America and the British Dominions must lead to, unless an outlet is opened for their activities in Asia. The industries of Japan will never stand the strain of absorbing 700,000 new laborers a year for any length of time, and the rest of the world is foolish to believe that it can be done without precipitating a struggle for existence which will again culminate in an explosion. True, Japan like France can practice some method of birth control and so lessen

the internal pressure. But with a neighbor whose procreative recklessness is maintained in check only by severe natural antidotes, it is futile to expect that the Japanese will submit to any restriction on their increase, while China pursues an opposite course. If the doors of other countries are closed to them and there are vast waste spaces in Eastern Asia awaiting settlement, we must expect that a virile people will fight for their right to occupy them before mutely accepting the alternative of race suicide.

Will the world refuse to heed the lesson of the last Great Sacrifice? Will the United States repeat the errors of European diplomacy and adopt a policy in the Pacific that will tend to exert the same pressure upon Japan as Europe brought to bear upon Germany? If the American people are determined that this policy be pursued, then Japan will have no option left than to follow in the footsteps of Germany and send her young men out into the world to capture its trade in order that the masses at home may live. Is Japan, like Germany, to be compelled to absorb her 700,000 new children a year into the ranks of her industrial army for the expansion of her factories, her mills and her looms? If so, we must face the consequences and meet their competition. For Japan must live. She must sell in order to purchase food. Like England, her very existence will depend upon foreign trade. She will create a vast mercantile marine and construct a formidable navy to ensure that her food lines will always be maintained open. She will become the Germany of the East, reaching out to all the markets of the earth to dispose of her products. She will develop into the England of Asia, a nation whose very life depends upon the maintenance of a powerful fleet. In the struggle for existence, Japanese products, like those of Germany, will find their place in the markets of the world, and the keen competition will engender trade rivalries, hatred, and ultimately strife.

If, in addition to closing our own doors to the mounting millions of Japan, we are to follow her into Asia and obstruct her economical and commercial expansion in regions still open to her in Siberia, in Manchuria and Mongolia, and permit her to be barred from the Philippines, are we not deliberately placing ourselves in the position, where, sooner or later, we may be compelled to fight Japan? If, in addition to carrying the burden of the Monroe Doctrine, we are to become the Guardian of China, the Protector of Russia and the Policeman of Central Asia, can we wonder that the Japanese masses look upon us with ill-will.

It is well for Americans to ponder over these truths, and give more thought and study to the problems of population than to sentimental ideals. We make no claim to infallibility. Perhaps our deductions are wrong, but they invite research and discussion. Read the works of J. O. P. Bland, and what he has to say about the reckless procreative powers of the Chinese, the root of all their woes. Lay aside sentiment and ideals long enough to probe into this phase of the Pacific problem. Then let us ask ourselves, are we to become the Don Quixote of the Twentieth century, or play the role of the "nigger who squat on the safety-valve of the 'Prairie Belle.'" The fundamental laws of nature cannot be set aside by sentiment, ideals or loose talk about the germs of Democracy, or other popular catch-words which appeal so strongly to the American people. Monkeying with the blow-off of a high pressure steam generator can result only in a repetition of the disaster which befell Europe in 1914.

The Yellow River Bridge

IN the building of the Yellow River Bridge, tenders for which have already been invited, the ministry of communications does not seem to have left any stone unturned in its effort to bring about the best possible result. A commission of four ad-

visers, bridge experts selected from America, Belgium, Britain and France, has been appointed to examine all designs to be submitted.

Some time ago the ministry invited Dr. J. A. L. Waddell to become the American member of the commission and Dr. Waddell has accepted. The invitation and acceptance were made through the Chinese minister at Washington. Dr. Waddell will therefore appear as the American representative on the board of advisory engineers to determine upon the award of contract in the Yellow River Bridge competition and has recently arrived in Peking.



Dr. J. A. L. Waddell,
Member of the Bridge Commission

Dr. Waddell is the author of several books his latest being "Bridge Engineering" in two volumes dedicated to the Emperor of Japan as a mark of the author's appreciation of the decoration "Knight Commander of the Order of the Rising Sun" conferred upon him by the Emperor.

A brief summary of the main features of Dr. Waddell's life follows:—

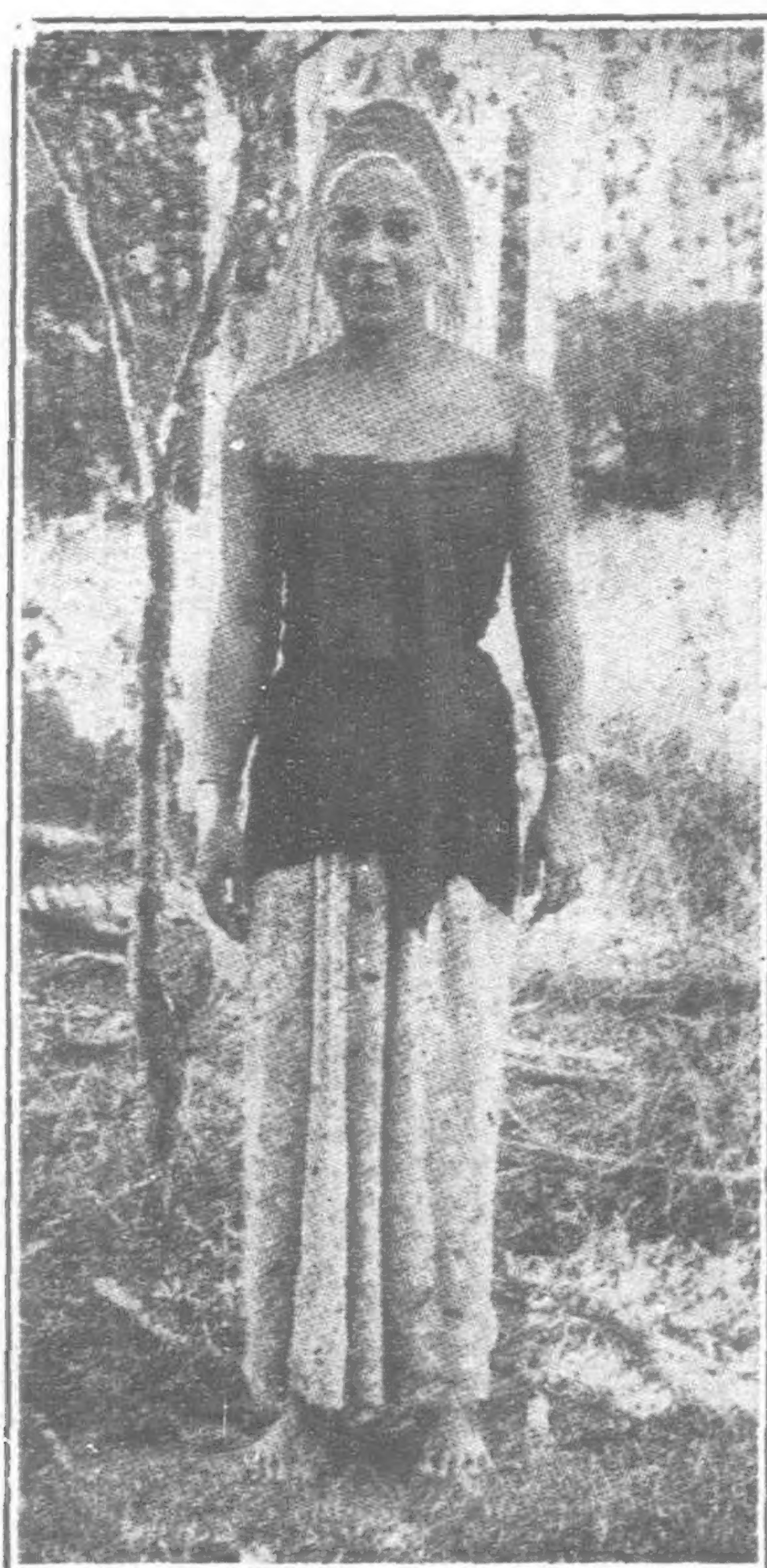
WADDELL, JOHN ALEXANDER LOW, C.E., B.A. Sc., MA. E., D. Sc., LL.D., D.E., Kogakuhakushi—Kansas City, Missouri. Born Port Hope, Ont., Jan. 15, 1854. Educated, Trinity College School, Port Hope; Rensselaer Polytechnic Institute, Troy, N. Y. (C.E., 1875); McGill University (B.A. Sc., 1882; Ma. E., 1882; D. Sc., 1904); hon. LL.D., Missouri State University, 1904; hon. D.E., University of Nebraska, 1911; hon. D.E., Imp. Univ. of Japan, 1915. Draftsman Marine Department, Ottawa, 1875; Engineer, Field Work, C. P. R., 1876-1877; Assistant Professor of Rational and Technical Mechanics, Rensselaer Polytechnic Institute, 1878-1880; Chief Engineer, Raymond & Campbell bridge builders, Council Bluffs, 1881-1882; Professor of Civil Engineering, Imperial University of Japan 1882-1886; practiced alone, Kansas City, 1887-1889; Partner of Waddell & Hedrick, 1899-1906; Partner of Waddell & Harrington, 1906-1915; Partner of Waddell & Son since 1915.

Kelantan and Its Natural Resources

By V. F. STANLEY LOW, M.Inst.M.M.

KELANTAN AND ITS PEOPLE.—The two least known or explored of the protected states of the Malay Peninsula are Kelantan and Trengganu. The states of the Malay Peninsula are so frequently spoken of as the "Federated Malay States" that perhaps it would be as well to state that only four of them are federated. British Malaya is divided into the British colony of the Straits Settlements (Singapore, Penang, Wellesley, the Dind-dings and Malacca), the Federated Malay States (Perak, Pahang, Selangor and Negri Sembilan), and five other protected native states (Kelantan, Trengganu, Kedah, Perlis and Johore) all of which acknowledge Great

and the neighboring islands. The so-called Malay is able to cultivate his land and grow rice, maize, fruit and vegetables; he is a skilled boatbuilder and boatman; he can weave silk and cotton; but he seldom produces an output of any of these articles beyond the immediate wants of himself and his family; and so great has been the kindness of Providence in furnishing rich soil, favorable climate, abundant fruits, and fish-teeming rivers that the life of the ulu, or up-country, Malay is one of comparative calm, ease and almost luxury. The Malay who has not come into much contact with members of other nations is by nature courteously polite, but shy; and nearly every Malay is a born liar, who finds no shame



Kelantan Woman Wearing the "Selumbong"



The Ruler of Kelantan: His Highness the Raja Snik bin Almorham Sultan Ahmat



Woman of Kelantan

Britain as suzerain. In each of the five last-mentioned states Great Britain is represented by an "adviser" appointed from the civil service of the Federated Malay States; and the native rulers of the various states are expected to follow the advice given by their respective "advisers." The governor of the Straits Settlements is also high commissioner for each of the native states, being represented in the Federated Malay States by a chief secretary, who resides at the capital, Kuala Lumpur.

There appears to be uncertainty as to the origin of the people generally classed under the title "Malays" who form the bulk of the population. By many these are thought to have come from Sumatra; but, no doubt, many people also came from Siam, Java

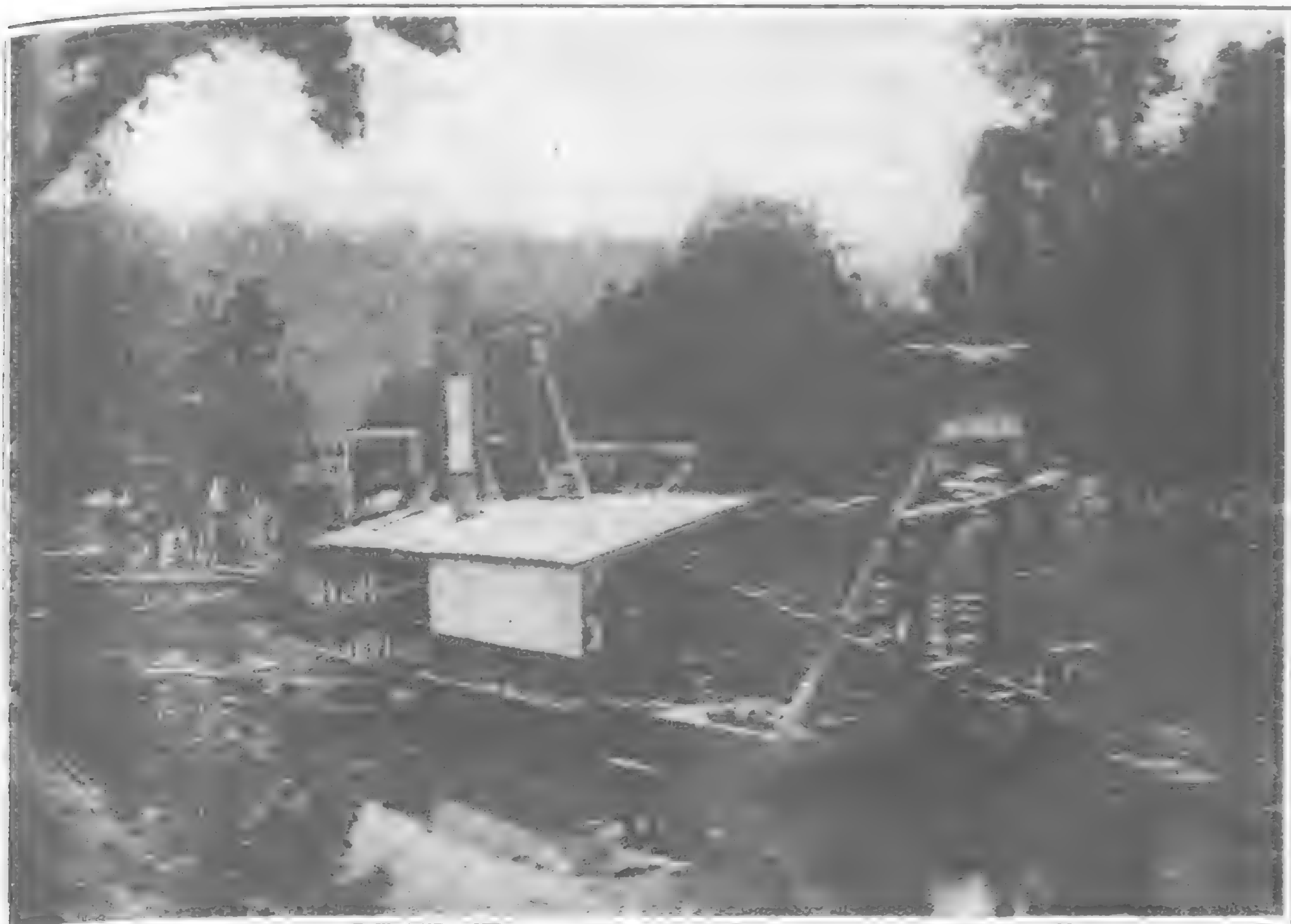


Kelantan Peasants

when his lies are exposed.

As a worker on the river, poling or paddling his native craft, the Malay is an untiring expert, and he is also good at jungle clearing; but he soon tires of regular employment unless it has something to do with engines or machinery. He is, therefore, of but little use for work on mine or plantation unless in charge of a launch or motor-car, of which he soon becomes a careful driver; and in these departments he frequently leaves his Chinese competitor far behind.

Only a few of the true aboriginals—the Saki—still remain. The Saki, as found in the eastern states, is, generally speaking, very shy and holds no converse with members of other races, be they white, black or yellow. He does no cultivation, but leads a



Gold Dredgers on the Kelantan River



Gold Dredgers on the Kelantan River

nomadic life, gaining his sustenance from roots, fish and birds, the last of which he brings down with darts discharged from a blowpipe some seven feet in length. Being a nomad he builds only temporary shelters, composed of palm fronds placed in the ground in a circle with tips inclined toward the centre so as to form a low shelter, in appearance like an upturned bowl. Sometimes the palm fronds are placed in a straight line so as to form a simple break-wind, the inclined and overhanging tips being sufficient to ward off the drips from the jungle of the heavy tropical dews. The Saki inhabiting the banks of the Nenggiri river are said to have become more settled. I have not come into contact with the Nenggiri Saki; but such Malays as I have met who have been far up that river have spoken of the Saki there as being well-developed men, skilful boatmen and good workers.

HISTORY AND GOVERNMENT.—British Malaya is a land without history or historical remains. Europeans have lived on the coast for at least four hundred years; but until 1860 there was only one white man known to be resident inland. Such development as had taken place prior to recent years was due to Chinese adventurers, and, in a less degree, to the Siamese; the Portuguese and Dutch appear to have allowed the country to live dormant. The time of

entry of the Chinese is unknown; but the turn of the tide came when the British took definite action in 1873. Almost the first matter in the native states to receive attention was that of state finances. By abolishing many of the taxes on exports and by taxing the importation of opium, spirits and such like; by charging rents for mining and agricultural lands, and by seeing that the money so obtained was properly expended, the financial chaos which previously existed was straightened out to such good effect that, as an example, the Federated Malay States are now become wealthy enough to make state loans to their neighbors, and at the end of 1918 had a surplus of over twelve million pounds sterling.

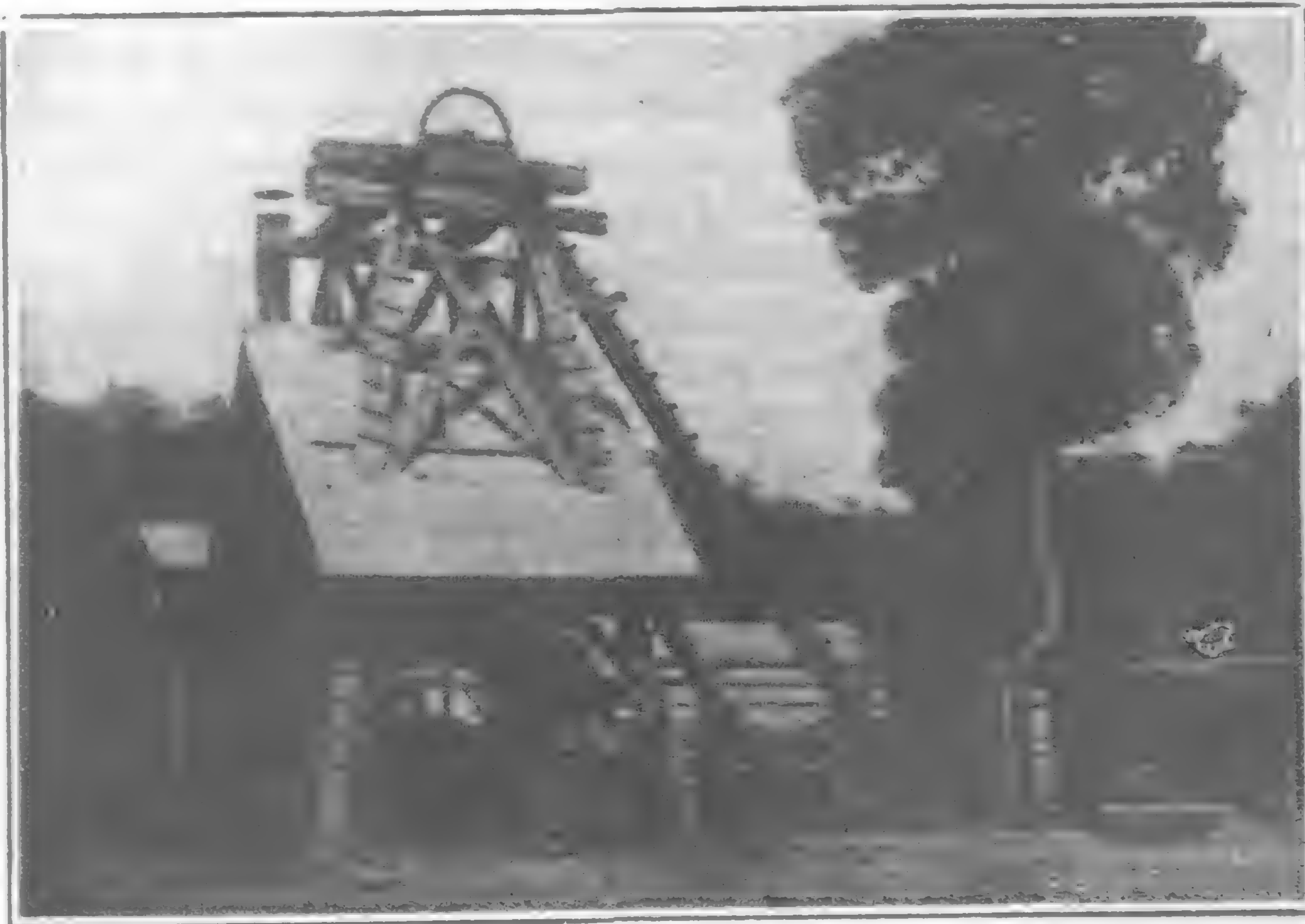
When, in 1903, the first British adviser was appointed to Kelantan, which then belonged to Siam, he found everything political in a rotten condition. The ruling Rajah, through the plotting of his own family (the usual practice in Malaya) had lost practically all power of governing; such taxes as it was possible to gather were not used for the benefit of the state; and no accounts of expenditure were kept. Under an agreement with Siam, Kelantan in 1909 became an independent state under the protection of Great Britain. Since then the ruling native potentate has been raised



Map of Malay Peninsula
Showing the Various States and Political Divisions



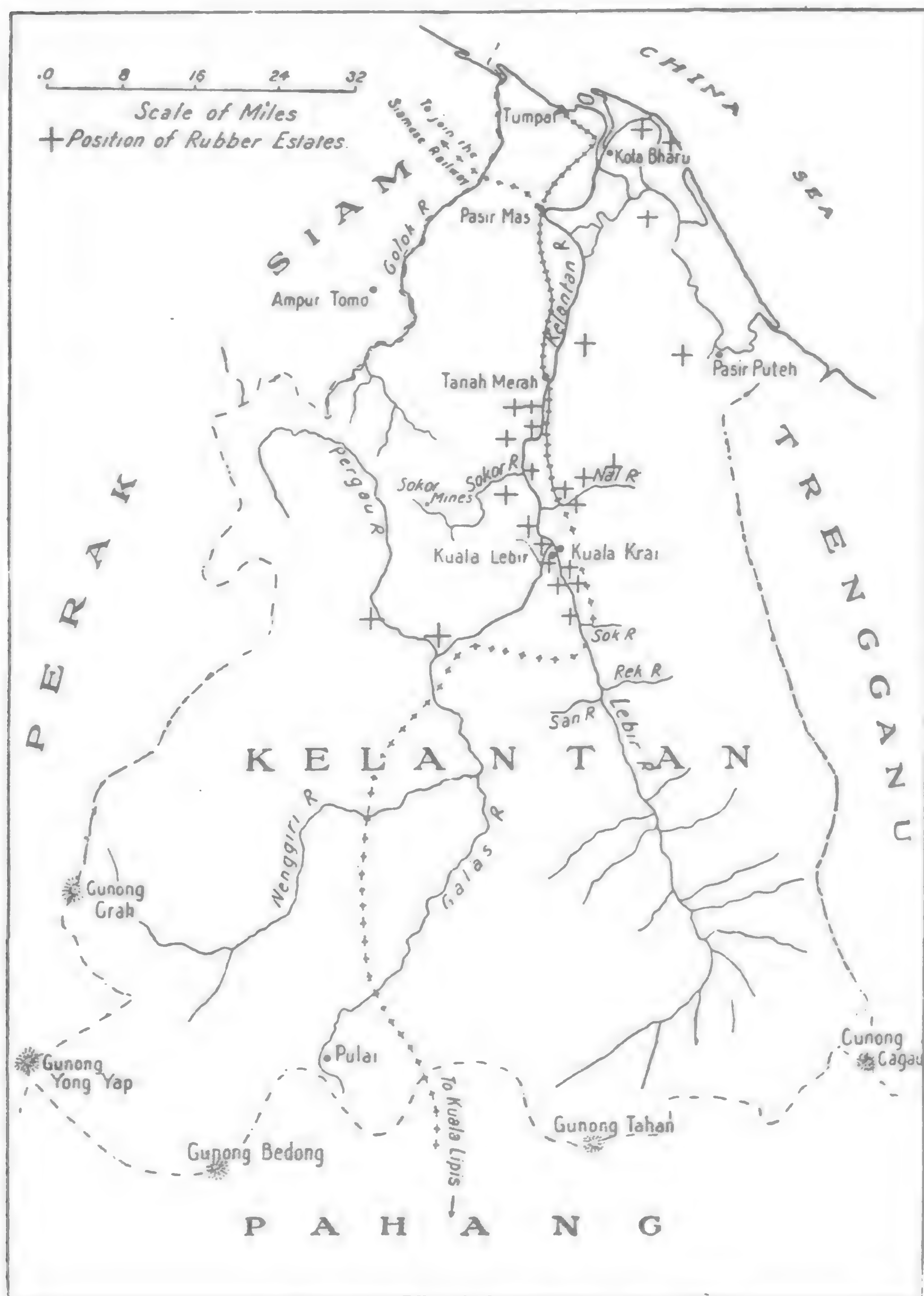
A Mining Camp, Kelantan



A Gold Mining Shaft, Kelantan

in dignity from Rajah to Sultan and governs the state with the assistance of a Council and under the advice of a resident British adviser.

Kota Bharu, the capital and seat of government, has two courts, the principal one being under the presidency of a British magistrate and the minor one under that of one of the Malay aristo-



Map of the State of Kelantan

cracy. District officers, appointed from the British side of the civil service of the Federated Malay States, attend to the magistracy of the country districts and reside at Pasir Puteh and Kuala Krai. The officers in charge of the lands office and of the survey department are British, as are also the chief police officer and his chief inspector. Most of the clerical work is performed by natives from India China, and Ceylon, assisted by a fair proportion of local Malays. The police force is composed of Sikhs and Malays. The Sikhs are purely military police; all civil police work is performed by Malays under Malay inspectors appointed by the chief police officer. All inspectors must pass an examination in English before appointment. There are three British doctors, and one Chinese doctor holding British diplomas, who are assisted in the various native hospitals by trained dressers drawn from India and China. There is no hospital accommodation for white people except at the private hospital of the Duff Development Company at Kuala Lebir.

COMMUNICATIONS.—Kelantan has a coast line of 45 miles and an area of 5,870 square miles; its greatest width is perhaps 75 miles. The country is flat along the coastal district; and it is said that three distinct old sea beaches may be traced, showing the rapid encroachment of the land on the sea due to the silt deposited by the torrential flow of the rivers during the rainy season.

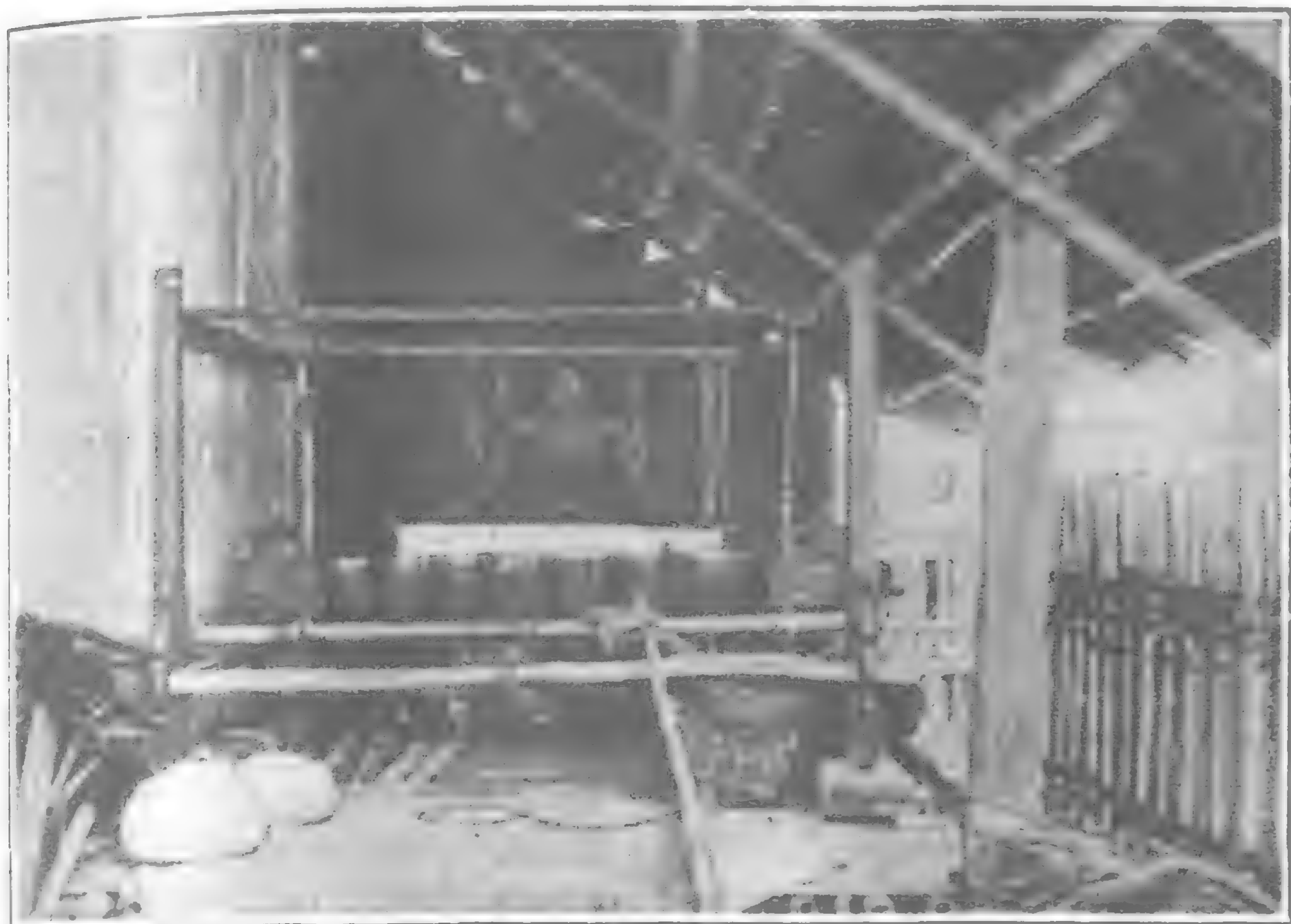
At a distance from the sea varying from 10 to 20 miles the land begins to rise and then quickly becomes mountainous, culminating on the southern boundary in Gunong Tahan—the Forbidden Mountain—7,186-ft. above sea level. This is about the highest peak in Malaya. The state is well watered throughout its length and breadth by rivers. The main river, the Kelantan, runs approximately north and is formed some 62 miles inland by the junction of the Galas and Lebir rivers. The main tributaries of the Kelantan are the Sokor and Nal rivers; but these two are not nearly so important as the tributaries of the Galas—the Pergau and the Nenggiri—which enter that river some 80 and 92 miles respectively from the coast. The Lebir has tributaries of fair size in the San, the Sok and the Rek.

The approach from the sea to Tumpat, the port of Kelantan, is bad, owing to the rapid encroachment of the land. A few years ago the custom house was situated on a coconut-grown island opposite the town of Tumpat and not far from the mouth of the Kelantan river. In those days coastal steamers on the way from Siam to Singapore entered an eastern channel, anchored behind the custom house, unloaded and reloaded, and then proceeded to sea through the western channel. Now everything has been changed, for the monsoons have made a low sandbank of the island which has spread out to such effect as to have formed a lagoon across the mouth of the river, leaving only a small opening for the passage of launches and lighters. The custom house and the coconuts have disappeared; and steamers must anchor outside at a distance of at least two miles from the landing place. In the monsoonal season Kelantan has been cut off entirely from outside communication for three weeks or a month at a time by the heavy seas breaking at the mouth of the only channel available. It is difficult to forecast what will happen unless a monsoon of exceptional violence follows the example of some of its predecessors and washes a new channel or entirely removes the sand-bank, because the lagoon which has been formed is being filled so rapidly with silt from the river that even the shallow-draft launches which traverse the rivers already find it difficult to cross the lagoon from the river mouth to the Tumpat jetty.

A railway is under construction and will eventually connect the Siamese system with that of the Federated Malay States by traversing the length of Kelantan and making a junction at Kuala Lipis in Pahang. For carrying out the necessary extensions in Siam to connect with Kelantan, and also to make another such extension on the west coast, the government of the Federated Malay States advanced four million pounds sterling to Siam. For a considerable time past trains have been running from Tumpat to Tanah Merah, 36 miles inland; and a branch line has been completed from Pasir Mas on this line to the border of Siam, where a junction should have been completed by this time with the Siamese system. It will be eight years or more before a junction with Kuala Lipis will be made, as there is much tunnelling to be done between Kuala Lebir and the Pahang border. So strange is the policy of the Federated Malay States government in some things that their railway department, which is carrying on the construction of the line in Kelantan, states that neither passengers nor goods will be carried beyond the present terminus, Tanah Merah, until the whole line to Kuala Lipis has been completed. Thus will the development of Kelantan be delayed by officialdom.

Kota Bharu may be reached in six miles by rail and ferry from Tumpat or in eleven miles by launch or native craft. Above Kota Bharu the Kelantan river is navigable throughout its length at all seasons by light-draft launches and lighters, as are also the Lebir for twenty miles and the Galas for 20 miles above their junction at Kuala Lebir, so that one may proceed upstream some 82 miles by branching off at Kuala Lebir into either the Lebir or Galas rivers. Beyond that distance the rivers are broken by rocks, rapids, shallows and sanbanks; and for the two months immediately preceding the rainy season are passable for only the lightest of native craft. During a great part of the rainy season, when the rivers may be expected to rise anywhere from sixteen to thirty feet above normal level, it is practically impossible for

native craft to go upstream, because the flow of the river is too rapid for oars or paddles to be effective, and there is too great a depth of water for poling; the thick jungle prevents the passage of boats along the edges of the flooded area. Therefore anyone



Silk Weaving, Kelantan

engaged in prospecting for gold on the upper Galas, or for tin near the source of the Nenggiri, could quite easily be cut off from efficient supplies of food and mining stores for four or five months in the year.

As Kelantan possesses only a very meagre mileage of roads, and as these roads are only lightly constructed and badly maintained, and are designed to serve the flat lands mostly planted with rice, very little development, from a mining point of view, can be expected until the railway has been opened, roads made, and tracks cut to districts now practically inaccessible.

The census of 1911 showed Kelantan to have a population of 286,751, of which 269,000 were Malays and 10,000 Chinese.

GEOLOGY.—Very little is known geologically of Kelantan; and there is no work published which deals with Malaya as a whole or the whole of any one state. Kelantan is so deeply covered with soil, so much of the country is dense jungle, and the outcrops of rocks are so few that geological examination and prospecting for minerals are difficult matters. The main backbone of mountains, which runs north-west to south-east down the Malay Peninsula, is composed of granite, and there are many subsidiary ranges east and west of this. It is stated that the Tahan range, on the boundary of Pahang and Kelantan, is composed of conglomerates, quartzite, and shale, while in Pahang conglomerate and sandstone ridges are found at the foot of the main granite range. A belt of limestone is said to cross the peninsula from Malacca to the coast of Kelantan; but the limits of this belt, if it exists, have not been demarcated. There are many outcrops of limestone; and limestone hills and cliffs, containing large caves whose floors are deep in the guano of bats, are frequently met with in Kelantan; but so little survey work and exploration have been done that the extent of the limestone belt is at present unknown. Even the maps which have been supplied by the government have been found to be grossly inaccurate; and my own experience has been that the least inaccurate maps are those which were prepared by the Duff Development Company for its private use. The most reliable map I was able to purchase from the government was, I believe, mostly compiled from one originally made by the Duff Company, to whom in all things relating to the opening up and development of Kelantan the present white population of the state owe many thanks, a fact which many of them seem to ignore or forget.

Apart from the limestones, quartzites, shales and conglomerates already mentioned, one finds clays, slates, schists, sandstones and granites, the last being predominant.

MINING OPERATIONS.—In spite of the difficulties of prospecting, the Chinese appear to have been through the country long ago; and at the only two places where lode-mining is known to have been attempted—near the Sokor river and at Kundor, near Pulai—the surface had already been prospected and sluiced for gold; but the lodes there had been allowed to remain otherwise undisturbed. In the neighboring states of Pahang and Trengganu the weathered outcrops of such lodes as have been found to exist there had been worked, without exception, by Chinese or Siamese in the years long gone by; and many hold that the most successful method of lode-prospecting is to follow the old native workings.

As the population of Kelantan is mostly confined to narrow strips along the banks of the main rivers, and as the Malay, as a rule, is either afraid or disinclined to go far into the jungle, very little information is to be obtained from them with regard to anything in the country except in close proximity to their homes; but it is possible that, when the country has been opened up by the advent of the railway and the population has become denser, further old workings will be found which will lead to the opening up and development of large ore-bodies lying in country now given over to tigers, elephants and panthers.

The Duff Company spent a large amount of money in prospecting and in dredging the river bottoms; but none of its mining ventures was attended with lasting success. It would appear that the dredges gave variable results, rich periods of work being much interspersed with very lean ones; the four dredges at work seem to have lacked efficient supervision from headquarters, and the gold returns to have been most erratic.

THE AUTHOR'S JOURNEYS.—A great deal of tunnelling and shaft-sinking was done by the Duff Company near the source of the Sokor river, on what are often referred to as the galena mines. Operations were carried on there until 1907. While awaiting the fulfilment of certain business negotiations with regard to a concession of two hundred square miles, which was the primary cause of my presence in Kelantan, I arranged a visit to these old mines. As the Sokor river enters the Kelantan river about midway between Tanah Merah and Kuala Lebir, I sent forward the leader of my party to engage men and boats and meet me at the mouth of the river. As I was on the point of leaving Kota Bharu to join the expedition, word was sent down that the men who had been engaged were afraid to proceed when they found that the expedition was to traverse the "poison" belt—the bad man's country—where it is said that one can arrange for the death of an enemy for half-a-dollar and where most of the native potions and poisons are compounded. I happened to mention the matter to the chief police officer, who sent a party of native police with me, and we proceeded upstream, engaged new men and boats, and started shortly after daybreak from the mouth of the river. We took the Duff Company's old route to the mine, poling up the Sokor river and then walking six miles overland. Estimates of the river distance were very variable, and, as before stated, the maps available very inaccurate. However, our boat journey occupied a good long day and a half; and, as the river at the time was fairly high, good progress was made until the middle of the first day. After that the river became a series of rapids, shallows, sandbars and deep pools, which meant wading in the water a great part of the time, digging passages through the shallows, and all hands hauling the five prahus which formed our means of transport. It was no uncommon thing to find the bows of one's prahu lying in ankle-deep water, while the stern projected over the edge of a steep bank of granite sand in a depth of over fifteen feet of water. We reached our river destination during the second day and pitched camp; and our six-miles tramp next day brought us to the deceased mining camp. This tramp was over the old wagon road of the Duff Company; and, although then devoid of bridges and much overgrown with jungle, the track was in otherwise excellent condition. As far as jungle growth was concerned, our way had been made easy by an adult and a baby elephant who had evidently traversed nearly the whole of the road the day before and whose beds of the previous night we passed on our journey. My natives were interested, but not afraid,

when we met with the elephant tracks. It was not until we crossed the spoor of a *sladang* (wild buffalo) that I had difficulty with my bearers, for the *sladang* is regarded as the most dangerous animal in the peninsula. It is a matter of common report in the East



House of a Malay Noble

that he who goes out to seek *sladang* must keep a watch to the rear as well as to the front, the *sladang* becoming the hunter instead of the hunted if sufficient care is not exercised.

Various tunnels into the hillsides were noted; but all that remained of the former main engine shaft was a jungle-covered hole and some rotting timber. History relates that after the mine had been closed, and even before the last of the stores had been carried to the river bank, the Malay natives had swarmed in and stolen every bolt and piece of iron from the headgear, even going part way down the shaft in search of bolts, etc.

No galena could be seen on any of the old dumps we were able to find; but records show that a parcel of about 57 tons was bagged and sent to the smelters just prior to the closure of the mine. The dumps examined showed that the bulk of the material mined must have been of a pyritic nature, and the records also show that 80 tons of such ore was dispatched about the same time as the galena. One of the old assay books discovered at Kuala Lebir showed the large amount of exploratory work which had been carried out, and that as the work proceeded the ground was regularly sampled and the results carefully tabulated. Most of the assays from the "galena deposit" show gold and silver values only; and some of these are of considerable richness. For example, the following values are taken from a width of ore varying from two to five feet: Gold 64.8 dwt., silver 1.6 oz.; gold 38.4 dwt., silver 2.3 oz.; gold 44.0 dwt., silver 4.0 oz. The following assays are recorded from "Manson's deposit": Gold 1.6 dwt., silver 4.9 oz., lead 12.5%; gold 2.8 dwt., silver 8.2 oz., lead 36.0%; gold 1.6 dwt., silver 3.3 oz., and lead 14.5%. The records also mention the diamond-drilling of vertical holes in the slates; but encouraging results do not appear to have been obtained. It would seem that the whole mining proposition at this place was killed by bad transport arrangements. A road from the Kelantan river to the Sokor mines, say, twenty miles in length, and then extended to the Pergau river, say, another five miles, would not only have served the mines then being worked, but would have opened up a most promising belt of country extending up to the Tomo (Siam) alluvial gold-field. In spite of the fact that labor was considerably cheaper in 1907 than it is to-day, it cost the Duff Company approximately £80 to bring a moderate-sized boiler from the mine; and the smaller items of machinery, weighing from 8 cwt. to 1 ton, were contracted for at a rate of about 3s. 10d. per cwt. The slowness of river transport may be gathered from the manager's statement that loaded prahus which had left the head of the river on the Tuesday could not be expected back before the following Saturday.

My return down stream in our lightly-laden prahus and with the channels dug on the up journey still available was comparatively rapid.

Upon another occasion I travelled on foot from the Kelantan to the Bertang river, a tributary of the Sokor, and found native mercury in the bed of the stream for quite a considerable distance in the Duff Concession. Later on I took an expedition up the Sokor river, where I was informed that quicksilver could also be found, for, if the metal could be found in both rivers, it meant the probability of an extensive mercury-bearing belt. On this occasion we travelled up the Sokor to our old river camp, but, the river being lower this time, we were forced to leave our largest prahu part way up and finish our river journey in relays. Arrived at our destination we set out for the spot where our guide said he had found mercury before; but none was to be found on this occasion, and it turned out that our guide had not been up-stream to the supposed spot for at least eighteen years. He had with him a specimen of galena which he said he had found in a hole 8-ft. deep some twenty-two years before, and was much incensed because I would not go with him to search for that 8-ft. hole which, according to the location given by him, must have been within the area afterward prospected and worked by the Duff Company.

Our last night at the Sokor was somewhat unpleasant, as the river began to rise and, having left our largest prahu some distance down stream, we had not sufficient carrying capacity for the whole of our men, kit and provisions. We were therefore faced by a raging torrent on one side and a jungle infested with leeches and wild beasts on the other, and of these the leeches were the worse, while the rain was coming down as only it can come down in the tropics. However, we managed to hang on until daylight, when we built some bamboo rafts and floated away on the tide of the flooded river.

I made expeditions to other places where tin was supposed to exist within easy reach, but found, as a rule, only iron sands.

Just before the wet season was expected I set out with my guide in two prahu-dowds for the upper waters of the Galas in search of that Golconda of Kelantan, the Kundor mines. A prahu-dowd is the largest form of native up-river boat; ours were about 50-ft. long and 5-ft. wide, having a covered-in living-room in the centre about 14-ft. long but only 4½-ft. high. Each was poled along by four Malays under the direction of the helmsman, who steered by means of a long oar lashed to the stern.

Prior to setting out on this expedition I went to Kota Bharu and asked the British adviser whether any of the land up the Galas river had been granted for mining purposes. The British adviser referred me to the district officer up-river at Kuala Krai. An inquiry from the said district officer received a reply that there were no papers in his office which showed that any of the land had been alienated for mining and that therefore all the land was open to me; but he advised me to take out a prospecting licence before starting. A Kelantan prospecting licence states clearly the location of the area to be prospected; but, as neither my guide nor I knew the exact location of the Kundor mine, but were to be met by local men sixty miles above Kuala Krai who were to take us to the spot, it was impossible for me to take out a prospecting licence at that moment; but I agreed to send a special messenger down for a licence as soon as I had located the old workings. This I did, applying for an area of 4,000 acres. I was away with my expedition for month, living and travelling in my prahu, and after having done some track-making and opening-up of the prospect, was compelled to return on account of the serious illness of my guide and also by the rapidly-approaching rainy season. On my arrival at Kuala Krai the district officer informed me that after my departure the British adviser had sent him some papers which tended to show that the land for which I had applied had already been alienated and was not therefore available. My protest to the British adviser brought the absurd reply that he was inclined to think that if I had obtained my prospecting rights before proceeding upstream from Kuala Lebir I should have avoided this loss of time and money.

My river journey of seventy miles from Kuala Krai to Pulau took sixteen days; and I had not travelled very far above the junction of the Pergau river before the difficulties of transport became apparent. The river had become impassable for anything but light-draft prahus; we encountered rapid after rapid, up which our prahus often had to be dragged with long ropes; and through many rocky and sandy places we had to dig channels for our craft.

The Chinese town of Pulau, which is known to have existed for over a hundred years, is a great contrast to the Malay kampongs with their jungle-constructed houses. In Pulau the houses are two and three storeys high, the thick walls being constructed of a lime concrete of rounded pebbles and river sand. The natives mostly make their living from alluvial mining; but the Kelantan government gets very little in the way of taxation from the district, as most of the traffic is by foot over the border into Pahang.

The Pulau Chinese are the remnant of a much larger population of the past. Some hundred years ago the ruling Rajah of Kelantan made over to his son the taxes on rice; these the Pulau Chinese refused to pay and, when the Rajah's son came to enforce the payment, they killed him. In revenge for this a punitive expedition was sent, with the result that most of the Chinese were killed, the Galas river ran red with blood, and was afterwards blocked by rotting corpses. Only a few of the residents escaped by hiding in the jungle; and those are said to be the ancestors of the present population. I had a number of Chinese working for me at Kundor and, although only one or two of them could speak Malay, we soon came to an excellent understanding. I found them a hardworking, jolly, capable crowd, and eight of them worked my prahus downstream for me as far as Kuala Lebir, that being much farther than they had ever been away from Pulau before.

Kundor proved to be about eight miles down river from Pulau; and an inspection showed that much alluvial gold must have been won there. The Chinese had constructed several miles of water-races, and in some cases they had cut these for a depth of 15 or

20-ft. through the granite. The property had been worked by a Dutchman in more recent years, and he had done a fair amount of tunnelling and shaft-sinking before his death. The reputedly richest portion of the property was at the junction of the granite and the slates, and I made arrangements with the Pulau Chinese for the opening up and repair of the old workings at the conclusion of the approaching wet season, only to find on my return to Kuala Krai that the ground was not available.

Coming down stream I stopped, inspected, and sampled several quartz outcrops of good appearance with a view to a return visit at a later date.

The occurrence of a tin lode was rumored on the border of Kelantan and Trengganu, and it is possible that such lode may exist, for in the state of Trengganu the privately-owned Bundi tin mine is reported to have given good returns to its owner. The neighboring state of Pahang gives the only other example of lode tin mining on a large scale in Malaya. In Pahang the Chinese and Siamese are known to have worked the soft outcrops of at least forty lodes. These lodes are in the slates near the junction with the granite, into which they sometimes penetrate. In Trengganu wolfram veins are found in formations of quartzite, schist and shale overlain by clays. The veins are worked only down to old water level, below which the sulphides of iron, copper and arsenic occur. The ore, as sent away, contains 70 per cent. of tungstic acid. Wolfram found in the Federated Malay States is associated with tin; in Trengganu wolfram is found alone.

Alluvial tin is found in limited quantities in Pahang, Trengganu and Kelantan; and it is a surprising fact that so much alluvial tin, shed from the range which forms the backbone of the peninsula, should so far, have been found on the western side and so little on the eastern side of the range. When it is remembered that the Malay States have produced tin to the value of £180,000,000, the small proportion obtained from the eastern states gives much food for thought.—*Mining Magazine*.



Type of Hall-Scott Motor Car, ordered for the British Section of the Kowloon-Canton Railway

Motor Coaches for the Kowloon-Canton Railway

THE Hongkong government is to experiment with motor coaches as a means of solving fast local traffic on the British section of the Kowloon-Canton Railway. Conditions in the leased territory are very similar to those of certain sections of the Western United States, where a cheap system of transportation is necessary to handle the passenger traffic through a sparsely-inhabited district. An order for two motor coaches and one trailer has been placed with the Hall-Scott Motor Car Company of San Francisco, through their China agents (The Northwest Trading Company), and are expected to arrive in the colony in September. The motor cars are 62 feet long, driven by six cylinder internal combustion

engines of 150 H.P. using kerosene as fuel, and are guaranteed to develop a speed of 45 miles per hour. The motor coaches have a seating capacity for 60 and the trailer for 80 passengers. The coaches are divided into first and third class, and the trailer into second and third-class sections. The cars will be built of steel, with double roof for ventilating, lighted by electricity and equipped with fans.

This type of motor car has been in successful operation for years on the Pacific Coast, and provides an economical solution to traffic problems where it is inadvisable to add to the locomotive rolling stock.



Panoramic View of Madras Harbor

Madras Harbor Works

THE administration report of the Madras Port Trust for the official year 1919-20 bears testimony to the foresight of those British administrators who, in the eighties, began the work which year by year has steadily progressed until to-day the harbor of Madras is one of the best east of Suez. The modern artificial harbor which now serves as the outlet for the east coast of India combines adequate facilities for handling not only the shipping of the present but also the great expansion which must inevitable result from the development of trade in the near future. The harbor as completed is about three-quarters of a mile square with an approximate area of 200 acres. The width of the entrance is 400 feet at which point the depth of the water at high tide is 39 feet and at low tide 34 feet. The last annual report shows that the year was a record one, the total value of the trade representing 51 per cent. of the sea-borne trade of the whole Presidency and amounted to 36½ crores of rupees compared with 23½ crores in 1913-14. (One crore with exchange at 24 pence to the rupee equals one million pounds sterling.)

During the year 521 vessels, with an aggregate tonnage of 1,166,352 tons, including 276 from foreign ports, 131 from coast ports and 99 country sailing craft, called at the port against last year's figure of 406 vessels of 679,983 tons. The largest vessel that entered the port was the steamer *Neuralia*, of Glasgow, of 9,082 tons gross and 5,656 tons net register, and the vessel with the deepest draft was the s.s. *Banka*, drawing 26-ft. 9-in. forward and 27-ft. 7-in. aft. Passengers to the number of 57,542 arrived at and 59,190 left the port, making a total of 116,732 against 92,654 of last year. Of the 422 steamers that used the port, 182 lay at moorings inside the harbor, 184 used the quays for landing cargo, passengers, horses, etc., 4 used the outside berths for landing explosives and combustibles and 6 anchored in the fairway.

The total tonnage of goods which passed through the port in the year amounted to 878,441 tons, exclusive of 62,123 tons of coal brought in by broad gauge wagons for transhipment to meter

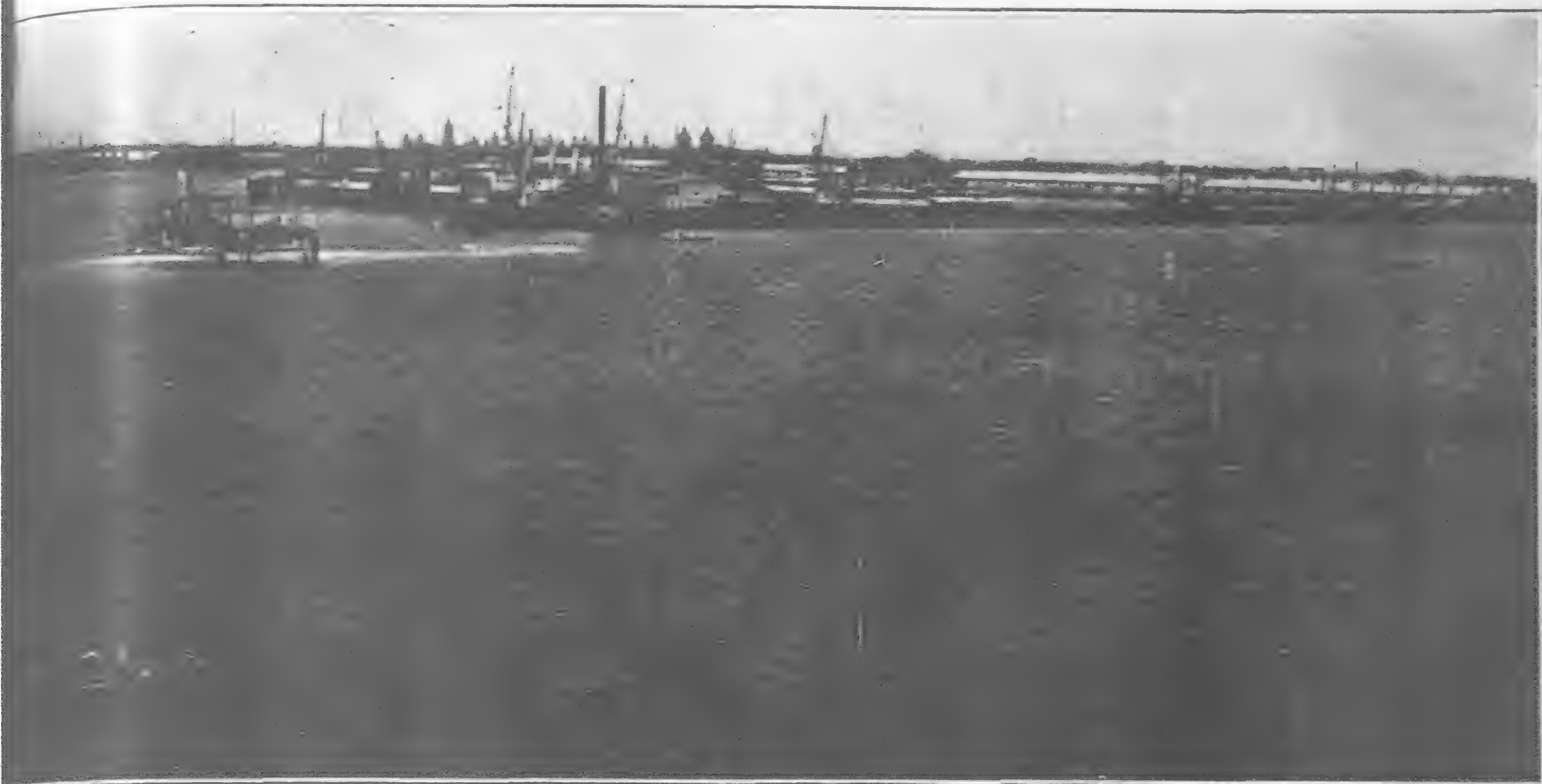
gauge wagons for the South Indian Railway against 609,480 tons last year and 797,665 tons in the previous record year 1913-14. Excluding all coal transactions the total tonnage of imports and exports by sea was 739,756 tons against 543,714 tons in 1918-19 and 627,954 tons in 1913-14.

As in other parts of the world, the port authorities had to contend against a shortage of railway wagons, which caused congestion at the wharves, the importers leaving their cargo uncalled for to save warehouse charges. This was remedied by imposing a penalty, and when the importers saw that the port authorities were determined not to allow their transit sheds to be used for storage purposes, they did their best to get the cargo cleared, and by extending free days, the whole of the cargo was disposed of without the imposition of the threatened penalty.

The Madras port authorities gained much valuable experience during this rush of traffic, and they now are confident that with adequate wagon supply they can easily handle 50,000 tons of grain a month, without interfering with the ordinary traffic of the port.

As an example of what can be done in unloading a vessel, the case of the s.s. *Ranee* is given. This vessel arrived alongside the wharf on August 13 with a cargo of 98,818 bags of grain weighing 7,600 tons, and working from 7 a.m. to 6 p.m. She was emptied on August 21, discharging on the quay on one side and into lighters on the other, the cargo being lifted from the lighters by the hydraulic cranes at either end of the berth. With the exception of about 3,000 bags removed by carts, the cargo was loaded direct into the railway wagons as it was landed.

The warehouse accommodations cover 12.30 acres, and the program for improvement includes considerable addition both in warehouses and transit sheds. A large quantity of plant held up in England during the war was received during the year, the chief items being a third hydraulic engine for the power house and four travelling hydraulic luffing cranes, 50 feet maximum radius, three of them having a lifting capacity of 35 cwt. and one of 5 tons. These cranes are installed on the West Quay and work direct from



Panoramic View of Madras Harbor—2

the ship's holds to the quay or railway wagons. The program for the future includes the provision of at least 12 more cranes of the same type.

Work on the breakwater progressed steadily during the year. The semi-permanent head composed of horizontal block work was completed to 10 feet above water, adding a length of 67 feet and making the present length of the sheltering arms, 1,600 feet. In this work 181,146 cubic feet of block work were used, making a total of 440,009 cubic feet of block work built into position since the commencement of the rebuilding. One hundred and twenty-two lineal feet of mass concrete apron or 34,492 cubic feet of con-

crete laid since the commencement. During the year 154 blocks, 64,072 cubic feet in volume, were manufactured. The steel work for the 48-foot diameter well caisson, which is to form the permanent head to the sheltering arm did not arrive till November. The cutting edge and four strakes of the caisson, a total height of 25 feet, were erected on the slipway and launched last year and the work is now well towards completion.

A feature of the port is the facilities provided for discharging bulk oil from tankers, 44 steamers using the north and south piers for this purpose. During the year under review, the pipe lines were relaid and a new valve house built. The system consists



Madras Harbor—West Quay Looking South



Madras Harbor—Ships Taking in Cargo at Berths Nos. 1 and 2 West Quay

of three 8 inch pipes leading from the discharging points on the pier to the valve house, the three lines being used for white oil and petrol, white oil and kerosene and fuel oil respectively. At the valve house are discharging connections enabling the oil companies to couple up their pipes to any of the discharge pipes.

Two dredges are at work inside the harbor deepening berths. The report gives a table showing their work and the cost per ton of handling material. For instance, in the fourteen years 1906-20, the dredger *Madras* averaged 1,194.4 tons per day at a cost of 6.15 annas per ton, or 9¼ pence (about 18½ cents gold), while in the year under survey, the average day's work was 850 tons at a cost

of 17.96 annas, or 27 pence (54 cents gold) excluding interest and depreciation, which brought the cut up 23.30 annas, 35 pence or 70 gold cents. The other dredger showed a lesser cost per ton, averaging 13.07 annas or 13.65 with interest and depreciation, a total of 20.5 pence or 41 gold cents. The increased cost are due to higher costs of plant and materials and less number of days the dredger was able to work.

Sir Francis Spring, K.C.I.E., the engineer-chairman of the Port Trust, retired on a pension in 1919, after fifteen years of service. He was succeeded by the Hon. Mr. H. H. G. Mitchell, O.B.E., M.I.C.F.



Madras Harbor—Loading Ground Nuts at the West Quay

Some New Steamer Launchings in China

A New Steam Tug

THE Hongkong & Whampoa Dock Co., Ltd. have launched the *Henry Keswick*, a steel twin-screw ocean-going tug and salvage steamer, which when completed will be placed in the Company's own service. The launching ceremony was gracefully performed by the Hon. Mrs. John Johnstone, the wife of the chairman of directors of the Company.

On commissioning, shipping interests in the Far East will be well served, for as may be seen from the following description, as a salvage steamer the *Henry Keswick* will be second to none east of Suez, and indeed may claim to rank with the most powerful tugs in home waters.

With long top-gallant forecastle, high casings, boat deck and navigating bridge, the *Henry Keswick* is well fitted for encountering the heavy seas of typhoon and monsoon seasons. The fuel capacity of this vessel of 362 tons of coal and 181 tons of oil represents at full speed 5,500 knots and at cruising speed 7,000 knots steaming radius.

The principal dimensions are as follows, viz.:—

Length, overall	...	...	...	174' 6"
Length, B.P.	...	...	...	165' 0"
Breadth over fenders	...	...	...	36' 7"
Breadth moulded...	...	...	...	34' 0"
Dapth moulded ....	...	...	...	17' 0"
Height of Machinery Casings, Boat Deck and Forecastle	...	...	...	7' 6"

The fact that the machinery and boilers are in separate water-tight compartments affords an excellent coaling arrangement and towing hook position amidships, thus guarding against any large change of trim between the fully laden and spent conditions.

Ample sub-division is provided forward and abaft the machinery spaces by oil-tight flats about 9-ft.

above keel, and by the five bulkheads to deck; in all nine large and four smaller buoyant compartments.

Oil fuel or water ballast may be carried in the after peak and in the three deep tanks, and 68 tons of fresh water in the fore peak, under the cross bunker, and machinery seating.

The ballasting arrangements for about 90 tons of salt water in two tanks forward and 110 tons in two tanks aft ensures a good displacement and easy means for trim correction when on harbor duty.

Two salvage holds have a bale capacity of 9,900 cubic feet, the forward hold being served by a 7-in. by 12-in. steam winch and 34-ft. 0-in. steel derrick tested to 20 tons, and salvage operations amidships by two 7-in. by 12-in. steam capstans, and derricks of three tons capacity. A third teams capstan having cylinders of 7-in. diameter and 12-in. stroke is fitted for warping purposes at the after end of vessel.

The equipment is in excess of classification requirements a precaution adopted by the Dock Company after many years experience in salvage operations. The stockless anchors are well protected by housing in specially designed hawse pipes, permitting

a free use of the bow fenders. An extra heavy anchor of Hall's admiralty type, with stock is conveniently stowed on deck for use when on salvage work.

Saloon accommodation on the forecastle deck and navigating bridge consists of five double-berth cabins, two bath-rooms and pantry. As occasion demands, the sofa-berths will accommodate an additional seven operators. The rooms are well ventilated and lighted. Tables can be laid for 14 in the dining saloon. Iron bunks for a crew of 24 are fitted in the forecastle.

Access to the engine and boiler rooms is entirely under cover of the side-enclosed boat deck, steel entrance houses being fitted on the upper deck port and starboard as a precaution when in a following sea. An 8-in. steel trunk through the cross bunker is fitted between the engine and boiler rooms.

Steam steering gear abaft the engine-room is controlled from the navigating bridge, all rods and gearing being led through the machinery spaces.

The machinery consists of two sets of triple-expansion direct-acting surface-condensing engines having cylinders 15½-in.-26½-in.-43-in. diameter by 30-in. stroke, capable of developing 1,800 I.H.P. (actually 1,950 at trial).

One condenser is fitted common to both engines, with two large exhaust shut-off valves so arranged that the condenser may be used for auxiliary purposes when in port or when engaged on salvage work. One Edward's type air pump, one bilge and one sanitary pump on each main engine are worked by levers and crosshead off the L.P. engine crosshead.

Boilers for either coal or oil fuel are two in number 15-ft. 0-in. internal diameter by 10-ft. 6-in. long, each being fitted with three Fox's corrugated furnaces 3-ft. 8-in. internal diameter, natural draught, constructed to board of trade and Lloyd's requirements for a working pressure of 180-lbs. per square inch.

The feed pumps consist of one set of Weir's twin pumps

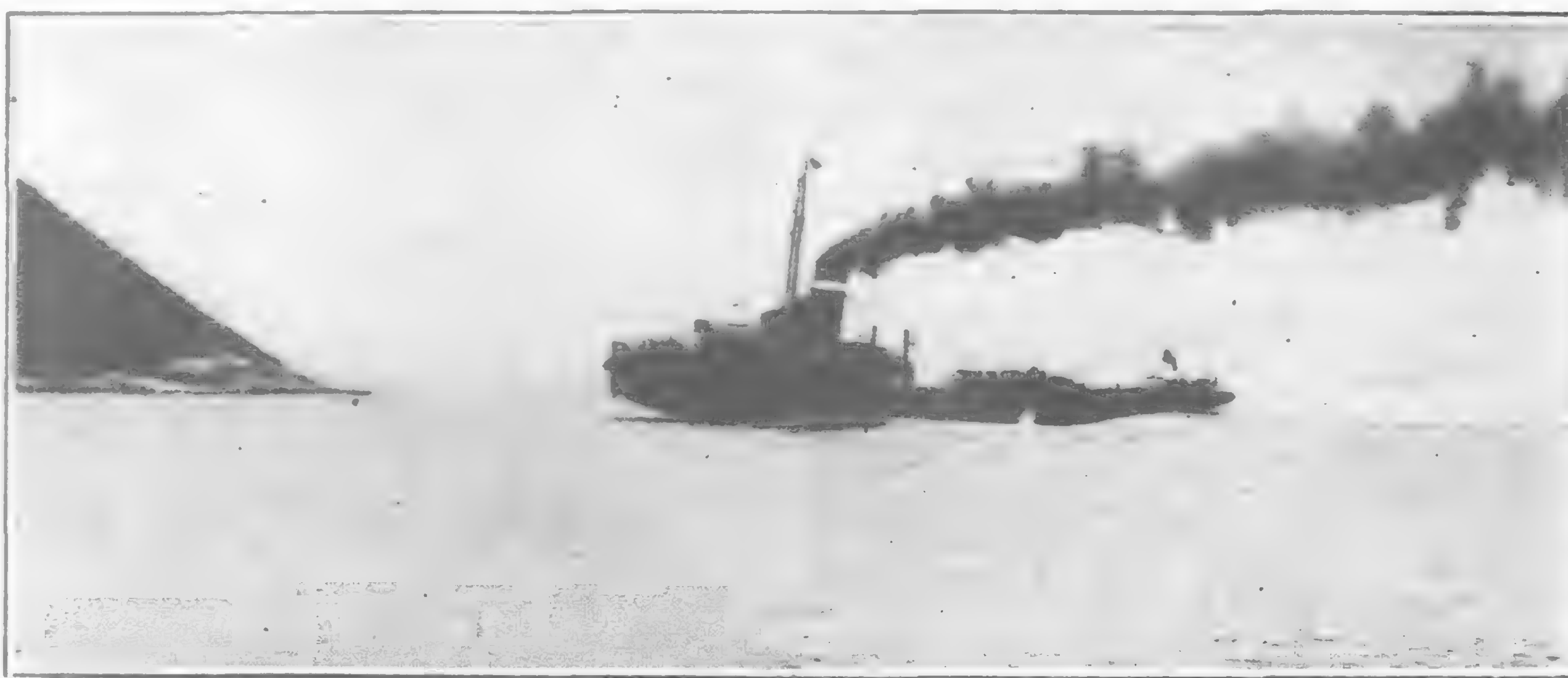
working in conjunction with a float tank. Two feed water filters are provided, one for each engine.

One 25-ton Weir's evaporator is fitted in engine-room together with a large Quiggin's distiller for fresh water purpose.

Two pumps for water ballast or oil fuel are fitted, one in the engine-room and one in the forward part of stokehold.

A "Merryweather" patent vertical double cylinder steam fire pump is fitted in the engine-room, designed to deliver 750 gallons per minute, with two hydrants on deck one port and one starboard taking six lengths of hose.

The salvage gear consists of a large compound vertical double-acting steam engine of 88 B.H.P., made by Messrs. Browett Lindley & Co., Ltd., driving a 59 K.W. direct current shunt wound 100 volt generator, made by the English Electric Co. This generator supplies current to two 8-in. and two 6-in. Merryweather submersible electrically driven pumps, provided with suction and discharge hose, all the necessary foot valves, flap valves, couplings, electric cables, etc.



The Steam Tug "Henry Keswick"

The vessel is fitted with a powerful wireless set on the boat deck, and is electrically lighted throughout, current being supplied by a 20 H.P. (13 K.W.) De Laval steam turbine dynamo.

Upon completion, Lloyd's highest class 100 A.1 with minimum freshboard will be awarded, the *Henry Keswick* having been specially surveyed during construction by Messrs. Gardiner and Morrison, surveyors to Lloyd's Register of Shipping. Certificates for Imperial registry, equipment and tonnage will be granted by Mr. William Russell, government marine surveyor, Hongkong.

The total salvage equipment, coal, oil, fuel, fresh water and stores will be 700 tons.

The S.S. "Kwangchow"

ON June 9th, there was launched from The Taikoo Dockyard at Hongkong, the steel screw steamer *Kwangchow*, a finely modelled vessel of the following dimensions, length 321 feet, beam 44 feet, depth moulded 23 feet and having a gross tonnage of about 2,500 tons. The vessel is built to the order of the China Navigation Co., Ltd., for their Bangkok trade, and has two decks, a long combined poop and bridge deck and top gallant forecastle. Accommodation is provided on bridge deck amidships for the officers, engineers and first-class foreign passengers. Chinese first-class accommodation is situated at the after end of the upper deck. The tween decks have also been made suitable for carrying passengers. The cargo gear consists of eight steam winches and derricks capable of dealing with weights up to 30 tons. The steam steering gear is of the "Wilson Pirrie" type fitted in house aft and controlled from amidships by telemotor gear. The cellular double bottom is constructed for the carriage of oil fuel and the force and after peaks can be used as trimming tanks. The propelling machinery consists of a set of "Brown-Curtis" type of turbines, comprising of H.P. and L.P. turbines combined with astern turbines, driving a single propeller through double reduction gear, capable of maintaining a total combined shaft horse power of 1,600 on ordinary sea service, with the turbines running at 3,500 revolutions per minute and propeller at 102 revolutions per minute. This machinery is supplied with superheated steam from one large multitubular marine boiler at a working pressure of 200-lbs. per square inch. The boiler is fitted so that either coal or fuel oil can be used for generating steam under forced draught on the "Howden" system. The vessel is also fitted with a "Cochrane" donkey boiler and all the latest auxiliary machinery and is lighted by electricity throughout. Messrs. Scotts' Shipbuilding and Engineering Co., Ltd. of

Greenock are the builders of the turbines and gearing while the boiler and all appurtenances have been made by the builders of the vessel. The naming ceremony was performed by Miss Edkins.

The S.S. "Kiangshun"

THE s.s. *Kiangshun*, the latest addition to the fleet of the China Merchants' S. N. Co., for their Yangtze River service, was successfully launched from the Pootung yard of the Shanghai Dock & Engineering Company.

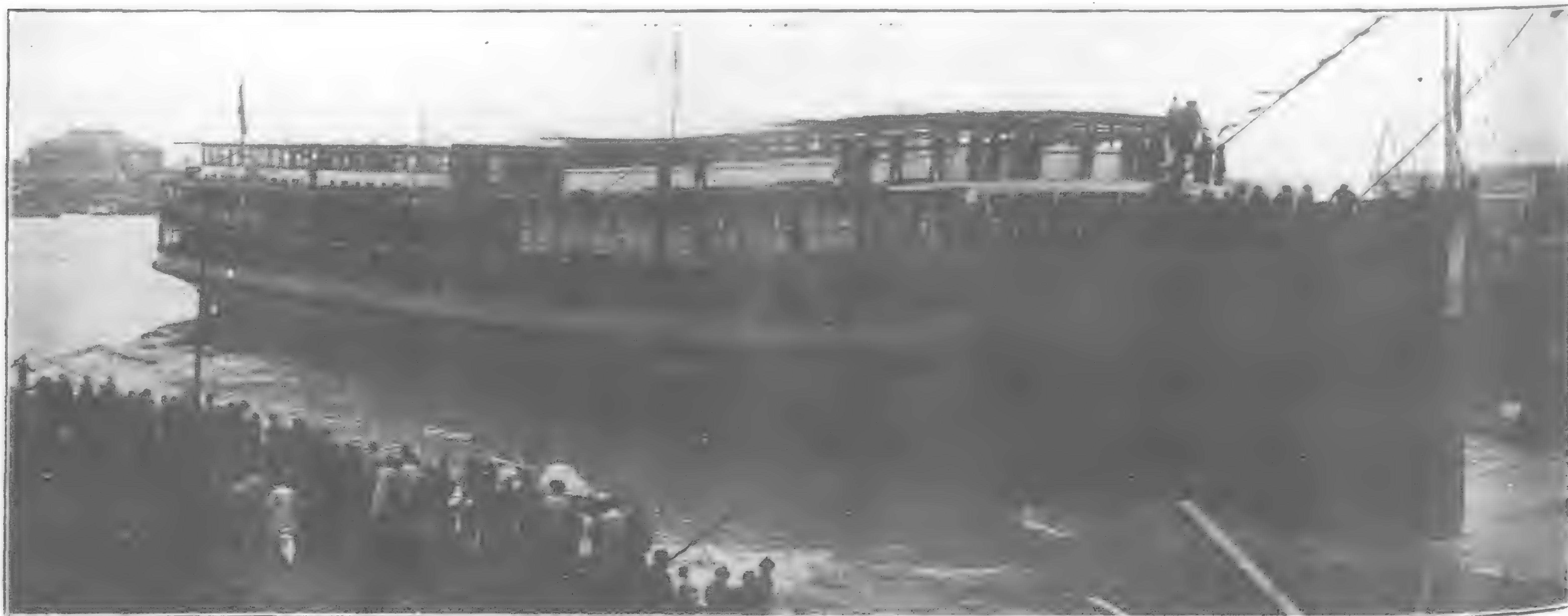
She measures 340-ft. long by 48-ft. moulded breadth and 24-ft. 6-in. moulded depth to upper deck and carries 2,150 tons dead-weight cargo on a light draft of 12-ft. 6-in.

The Chinese saloons and passenger accommodation is placed on the upper deck and large first-class saloons and state-rooms for 28 first-class and 40 second-class passengers forward, and 34 second-class and 164 third-class aft; the petty officers and crew are comfortably placed in the forecastle and the comradore staff and other supernumeraries are placed amidships. On the deck above the upper deck is placed the first-class European accommodation consisting of a large and luxuriously appointed saloon forward and state-rooms for 16 passengers; the officers and engineers are comfortably placed amidship and the after end of the deck is occupied by a large saloon and state-rooms for 56 second-class passengers.

The deck above the European accommodation is arranged for navigating purposes with large wheel house and spacious rooms for the captain and pilots.

The propelling machinery of about 3,200 indicated horse-power built in the Dock Company's workshops consists of two independent sets of triple-expansion surface-condensing engines each fitted with the usual pumps and direct-acting steam and oil-reversing gear, while steam is generated in two large cylindrical multitubular boilers 16-ft. 9-in. diameter fitted with Howden's forced draft and designed for a working pressure of 180-lbs. per square inch and an auxiliary boiler of the same working pressure for general service--the main boilers are the largest so far made in China.

The auxiliary machinery includes independent centrifugal circulating pumps, Weir's feed and general service pumps and feed heater, Weir's ballast pumps, sanitary pumps, two large steam-driven dynamos for lighting and fans, steam steering gear, steam windlass, steam capstan aft and other fittings as usual in a steamer of this class.



Launching of the China Merchants S. N. Co.'s New Yangtze River Steamer "Kiangshun" at the yards of the Shanghai Dock and Engineering Company.

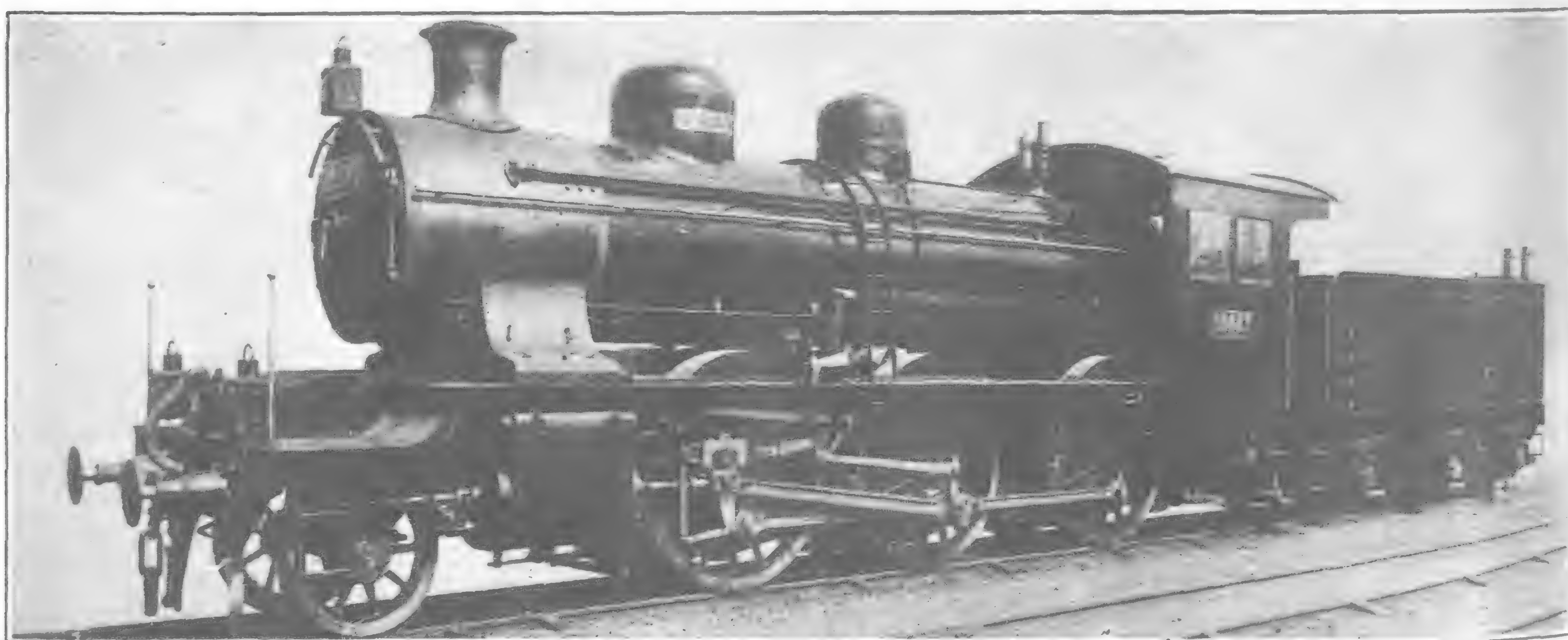
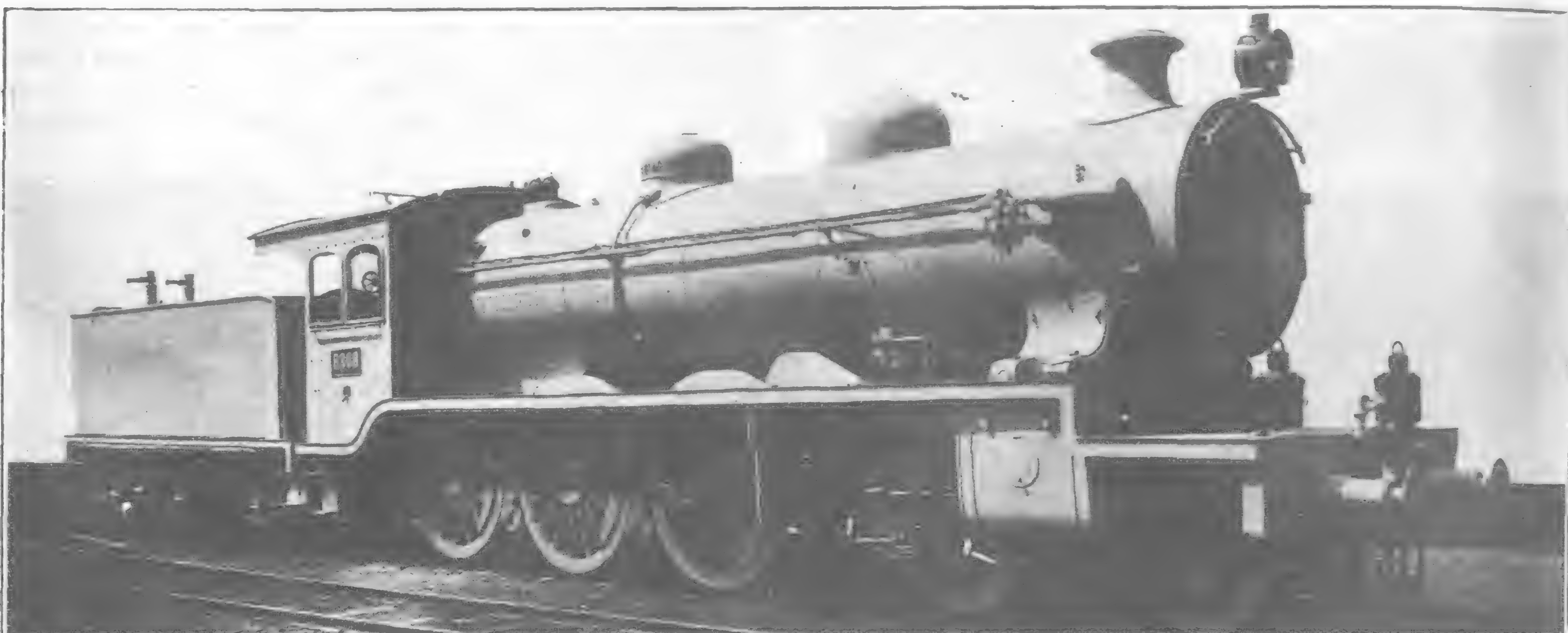
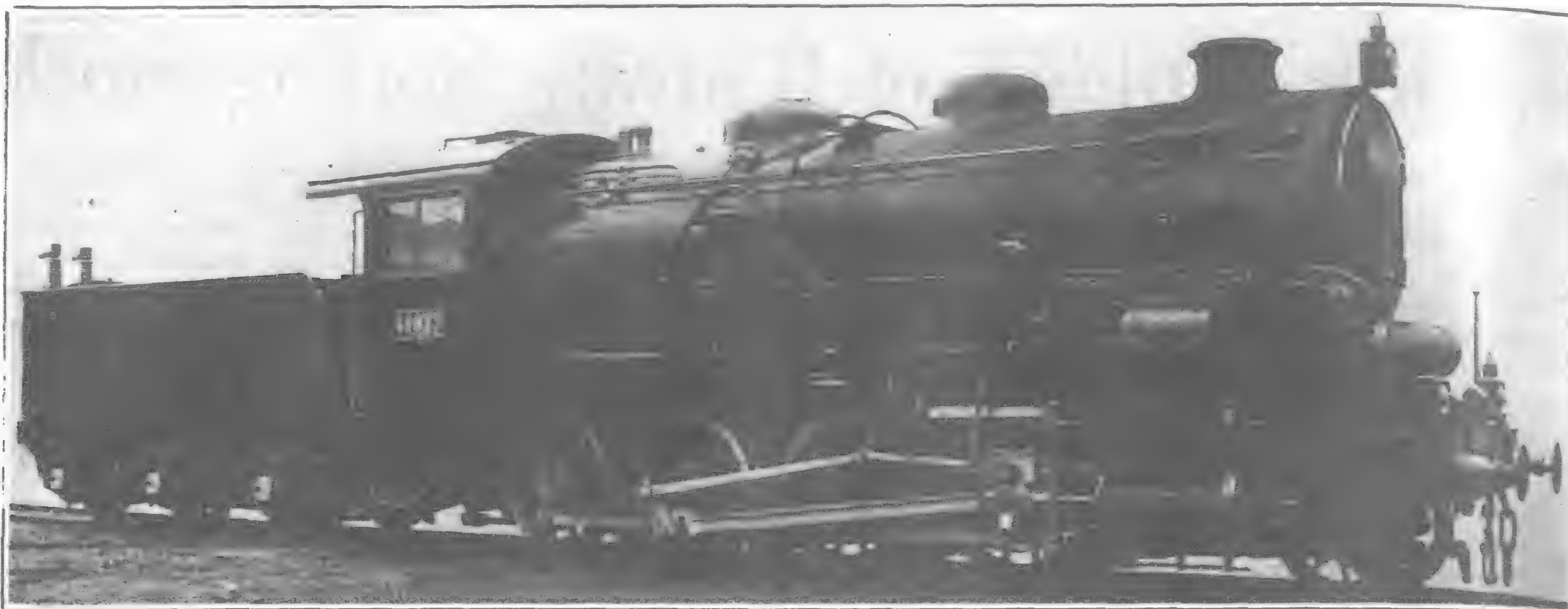
Japanese Builders of Railway Rolling Stock

THE nationalization of Japan's railways gave a great impetus to the growth of locomotive and car building in that country and opened the way to a steady development of domestic plants which have now attained a high state of efficiency in the matter of production and workmanship. When the railways were nationalized, owing to the imperfect development of the domestic industries, Japan depended solely upon foreign makers for locomotives, as only the manufacture and repair of cars were undertaken at the railway shops. Under the new program the policy of supporting domestic industry has been consistently pursued and it was not long before the native car and locomotive builders attained greater efficiency in workmanship and capacity. By 1913, all orders for new equipment could be placed with the domestic plants, and the government railway shops were devoted almost exclusively to the repair of equipment and the manufacture of certain special cars. This policy has been religiously adhered to, for we find in the last annual report of the department of railways that the government workshops built only 6 new locomotives, 4 passenger coaches, 9 electric tramcars and 244 freight cars for the year ending March 31, 1918. This throws upon the private rolling stock manu-

facturers the task of keeping the home railways supplied with new material, a protective policy which has largely contributed to the prosperity and expansion of home industry. Hundreds of new and powerful locomotives have been designed by Japanese engineers and built at Japanese shops. The industry is no longer in the experimental stage but so firmly established that Japanese manufacturers are well qualified to take the place of their foreign compeers in filling home requirements, and in some instances they have met the wants of other railways in the Far East. From now on, foreign manufacturers must reckon more and more with the possibilities of Japanese competition in Asiatic markets, especially in China. Under the terms of the consortium, railway materials will be purchased at public tender from the manufacturers of the various lending nations, which opens the door to Japan for an equal footing in this respect, an advantage that her manufacturers will undoubtedly seek to make the most of. Not only in locomotives, but in cars, Japanese shops have established a high record in their own country, while the work of the South Manchuria Railway Shops at Shakoku in turning out standard gauge cars and locomotives for the Manchurian and Korean systems is, according to foreign engineers who have investigated and reported on their efficiency,



Railway Shops of the Hyogo Works of the Kawasaki Dockyard Company



Types of Passenger and Freight Locomotives Built for the Imperial Government Railways of Japan at the Hyogo Works of the Kawasaki Dockyard Company

Of 3,122 locomotives in use in March, 1920, 983, or over 31 per cent., were constructed in Japan either at the Kawasaki Dockyard or by the Osaka Railway Car Co. Of the remainder, Great Britain built 28 per cent. and the United States 31 per cent.

of the highest workmanship. In the March, 1921, number of THE FAR EASTERN REVIEW was published a detailed description of Japanese Locomotive and Car Practice and Specifications.

There are several large private Japanese plants who have specialized in locomotive and car building, amongst which may be mentioned the Kawasaki Dockyard Company of Kobe, the Kisha Seizo Kabushiki Kaisha (Locomotive Manufacturing Company) of Osaka, the Nihon Sharyo Seizo Kabushiki Kaisha (Japan Rolling Stock Manufacturing Company) of Nagoya, The Fujinagata Dockyard, the Umebachi Engineering Works, the Kasado Dockyard and others. The slump in shipbuilding which threatened to ruin many of the smaller yards in Japan has been the cause of turning their attention to other outlets for their activities and several are now specializing in railway materials.

Seizo Kaisha with 120 and the Nagoya Works of the same company with 300. These cars are all of a total length of 55-ft. 6-in. by 9-ft. 2-in. in width.

Freight cars are turned out by the Tokyo Works of the Kisha Seizo K. K. having an annual capacity of 1,700 cars, the Nagoya Works of the Nihon Sharyo K. K. with an output of 2,400, the Tokyo Works of the same company with 1,200, and the Hyogo Works of the Kawasaki Dockyard with 1,200 cars. The above figures show a total annual output of the private Japanese works of 305 locomotives, 820 passenger cars and 6,500 freight wagons.

If we add to the locomotive figures the capacity of the Shinkoku Works of the South Manchuria Railway, the annual output of Japanese plants, exclusive of the several government shops, would be approximately 350 locomotives. The number of loco-



Interior Views of the Osaka Locomotive and Car Works of the Kisha Seizo Kaisha, Limited

The most important of the private Japanese builders of locomotives is the Kawasaki Dockyard Company whose Hyogo Works are almost entirely devoted to this industry, with the Osaka Works of the Kisha Seizo Kabushiki Kaisha, a close second. The Kasado Dockyard Company comes third. The annual locomotive output of these works is as follows: Kawasaki Dockyard Co., Hyogo Works, 150 locomotives, Kisha Seizo Kabushiki Kaisha, Osaka Works, 120 locomotives and the Kasado Dockyard Company, 35. Most of these locomotives are of the 70-ton type with tenders of 50 tons.

Car manufacturers are more numerous, and we have the Hyogo Works of the Kawasaki Dockyard with an annual capacity of 150 passenger cars, the Tokyo Works of the Kisha Seizo Kabushiki Kaisha with 250, the Tokyo Works of the Nihon Sharyo

tives operating on the government railways in the year 1913-14 was 2,500, while at the end of the fiscal year 1919-20, this had increased to 3,121, a total of 621 locomotives in six years or an average demand for about 100 new locomotives a year. This would indicate that the home industry is well able to take care of the present national requirements, and as time goes on, other markets will have to be found for the output of these private plants, if they are to continue to operate at a profit.

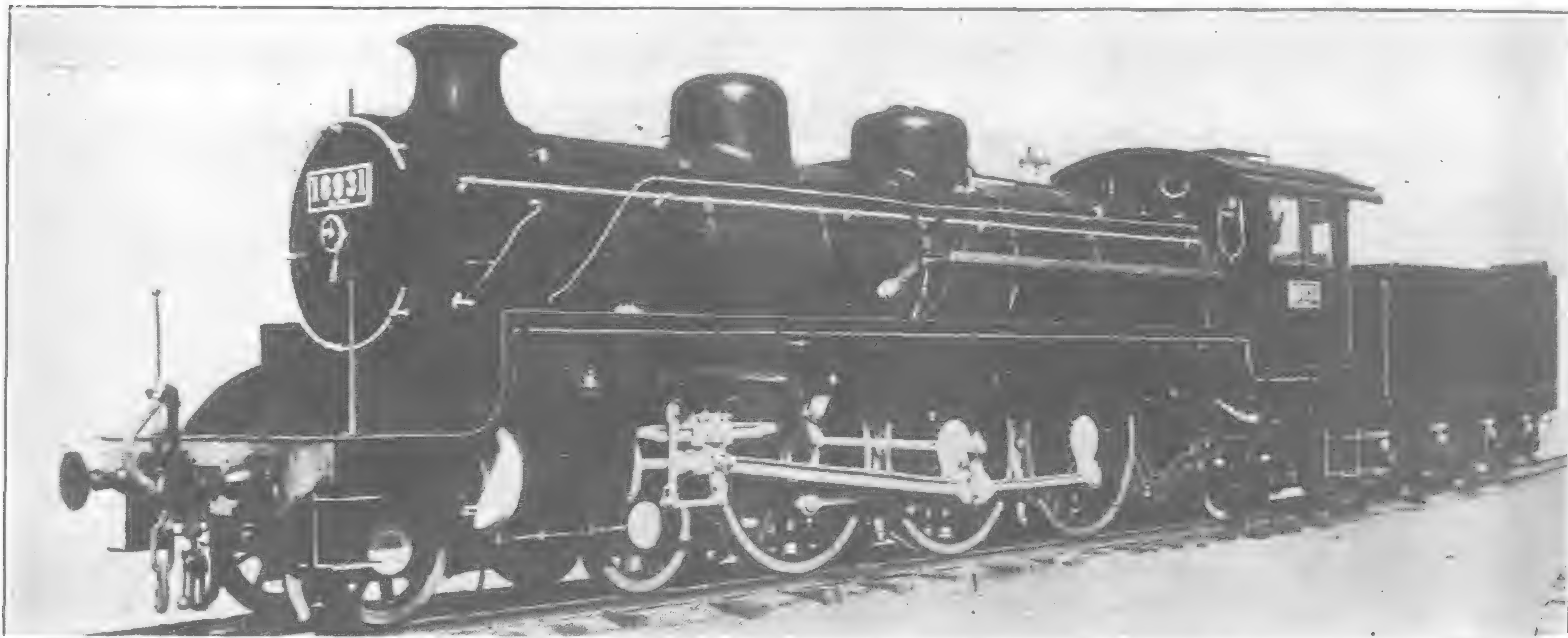
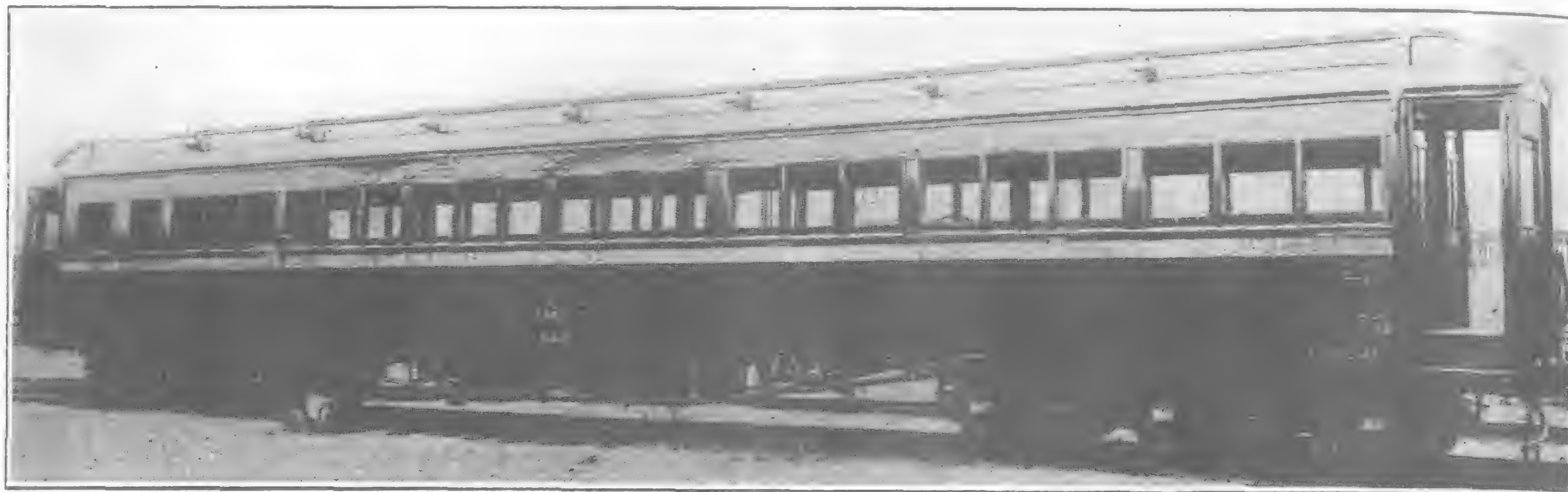
The actual number of locomotives furnished the government railways by private builders for the year 1919, was 187, and for 1920, 170. The following is an official resume of the number of locomotives and cars purchased by the government railways from private manufacturers during the years 1919-20:

LOCOMOTIVES AND TENDERS

Fiscal Year	Builders	Type			Total No
		2-6-0	2-8-0	4-6-2	
1919	Kawasaki Dockyard Co.	...	—	111	111
1919	Kisha Seizo K. K. ...	...	61	15	76
1919	Kasado Dockyard Co....	...	—	—	—
Total No. Built		...	61	126	187
1920	Kawasaki Dockyard Co.	...	26	73	99
1920	Kisha Seizo K. K. ...	...	47	—	59
1920	Kasado Dockyard Co....	...	12	—	12
Total No. Built		...	85	73	170

The Kisha Seizo Kabushiki, Kaisha

Typical of the development of the rolling stock industry in Japan is the growth of the Kisha Seizo Kabushiki Kaisha, one of the first private enterprises to enter the field in competition with foreign manufacturers for the supply of the domestic railway requirements. This company was organized in 1896 after the termination of the Sino-Japanese war, at a time when there was a boom in new railway construction. Like many other important Japanese enterprises, it had as promoters and sponsors some of the most powerful and far-sighted leaders of Japan who foresaw the necessity of building up the national industries in order to become independent of foreign manufacturers. The leading spirit in the organization of the company was the late Viscount Masuru Inouye.



Types of Passenger Locomotive and Coach for the Imperial Government Railways of Japan, built at the Osaka Works of the Kisha Seizo Kaisha

Fiscal Year	PASSENGER CARS AND WAGONS		
	Builders	Passenger Cars	Wagons
1919	Kisha Seizo K. K. ...	94	810
1919	Amano Works ...	53	772
1919	Nihon Sharyo S. K. K. ...	121	1,278
1919	Kawasaki Dockyard Co. ...	77	—
Total No. Built		345	2,860
1920	Kisha Seizo K. K. ...	93	537
1920	Amano Works ...	68	357
1920	Nihon Sharyo S. K. K. ...	130	638
1920	Kawasaki Dockyard Co. ...	103	—
Total No. Built		349	1,532

founder of Japan's railways and for many years chief of the railway bureau. He had as enthusiastic co-workers the late Marquis Kaoru Inouye, Baron Yanosuke Iwasaki, Viscount Shibusawa, Marquis Mori, Marquis Mayeda, Baron K. Sumitomo, Baron Denzaburi Fujita and several other influential business men, thus ensuring success from the start.

In September, 1897, the enterprise was converted into a limited partnership with a capital of Y.640,000, and strongly supported by such powerful capitalists as Sumitomo, Fujita, Okura, Takata, Morimura, Imamura and the late Matsumoto, as well as the feudal lords of Mouri, Mayeda and Hachisuga. The main office and works were located at Osaka, in their present site in Shimaya-machi, Nishi-ku, at that time in the open country on the right bank of the lower Ajikawa River and within a stone's throw of the Ajikawa station of the Nishinari railway line whose

tracks extend into all the yards of the works. Further transportation facilities were secured by the construction of a dock to the south of the factory, thus permitting receipt and dispatch of raw materials and the finished products direct to ocean and coastwise



Osaka Works of the Kisha Seizo Kaisha

steamers. At the same time the company acquired the Hiraoka Iron Works situated in Kinshi-bori, Honjo-ku, in Tokyo, which were converted into their Tokyo branch works and offices.

As the result of indefatigable efforts on the part of its directors (then presided over by Viscount Masaru Inouye, with Mr. Hiroshi Hiraoka as vice-president and Mr. Shogo Hasegawa as manager) the company was well equipped to reap the advantages of the railway boom that took place on the termination of the Russo-Japanese war in 1905. In October, 1912, the enterprise was again reorganized into a joint stock company and the capital increased to Y. 2,700,000, all of which is paid up with the exception of Y. 487,650. The financial position of the company provides a striking tribute to the skilful management of the late Viscount Inouye and the present manager, Mr. Shogo Hasegawa, during all these years, as it now has a reserve fund of Y. 3,204,468 with bonds outstanding to the extent of only Y. 300,000. While the majority of Japanese industrial concerns have passed through their alternating periods of prosperity and adversity, the Kisha Seizo Kaisha has not experienced since its organization a single set-back, but has progressed slowly and steadily to its present high state of prosperity and efficiency.

The company has been exceptionally fortunate in having the invaluable counsel and aid of Viscount Shibusawa and Baron Mori, and the services of the most expert engineers under the direction of Mr. Shogo Hasegawa, one of the foremost engineers of Japan. The policy of the company has been one of seeking constant improvement, efficiency and, above all, financial and business stability. To this end distribution of profits to the shareholders has been kept down to a reasonable dividend in order to pay off debentures and build up a large reserve for expansion and betterments. The result is seen in the handsome reserve fund, which enables the company to do business far in excess of its capital without recourse to the banks for accommodation. In these days of business depression in Japan, with many war concerns going on the rocks and others curtailing their activities, the shareholders of the Kisha Seizo Kaisha have just reason to be proud of the management which enables them to weather the storm.

Since its organization, the company has specialized in the manufacture of locomotives. Foreign engineers who have inspected the works and its products frankly state that these not only compare favorably with locomotives made in Europe and America, but in some particulars they possess distinct advantages. Many of the finest and most powerful engines in operation on the imperial government railways have been turned out at the Osaka Works of this company. In addition, passenger and freight cars of all types and sizes are manufactured for the domestic narrow gauge railways and electric tramways, while standard gauge cars

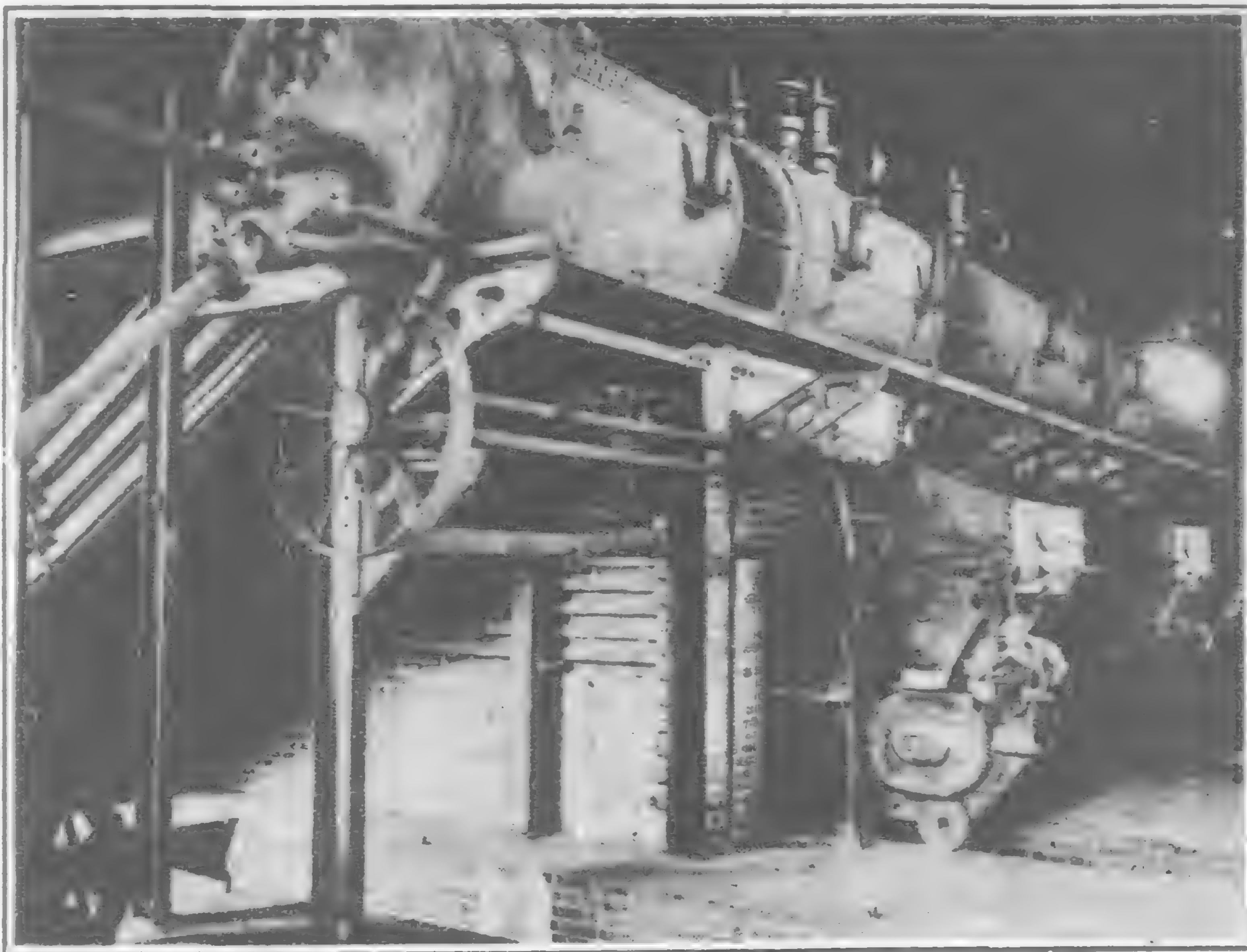
have been built for the Korean and Manchurian lines. The shops are equipped to make cars for any gauge of line.

The powerful locomotives built by the Osaka Works employed on the Abt railway over the Usui pass of the Shin-Yetsu line of the government railways, have called forth unstinted praise and admiration from engineering circles. Bridges and structural steel buildings are also built by the Osaka Works. The magnificent long railway bridge over the Dakusukei River in central Formosa turned out by the works stands as one of the highest testimonials to their efficiency in this line. The works also specialize in the manufacture of certain machine tools, and in the Takuma patent water tube boiler, the patent rights for which were acquired last year from the Takuma Boiler Manufacturing Company. Many improvements have been made which reduces fuel consumption and increases their efficiency, and the works are now busy on many orders for these boilers from industrial plants in Japan.

The head office and works of the company are located at Shimaya-machi, Nishi-ku, Osaka. The buildings cover an area of about 38,400 square yards, with a total ground area of approximately 120,000 square yards. They are equipped with 860 machines, have a total horse power of 2,514, and employ 1,800 workers.

The branch office and works are located at Kinshi-cho, Honjo-ku, Tokyo. The buildings cover an area of approximately 28,000 square yards with a total ground area of about 53,000 square yards. They are equipped with 200 machines with a horse-power of 600, and employ 800 workers.

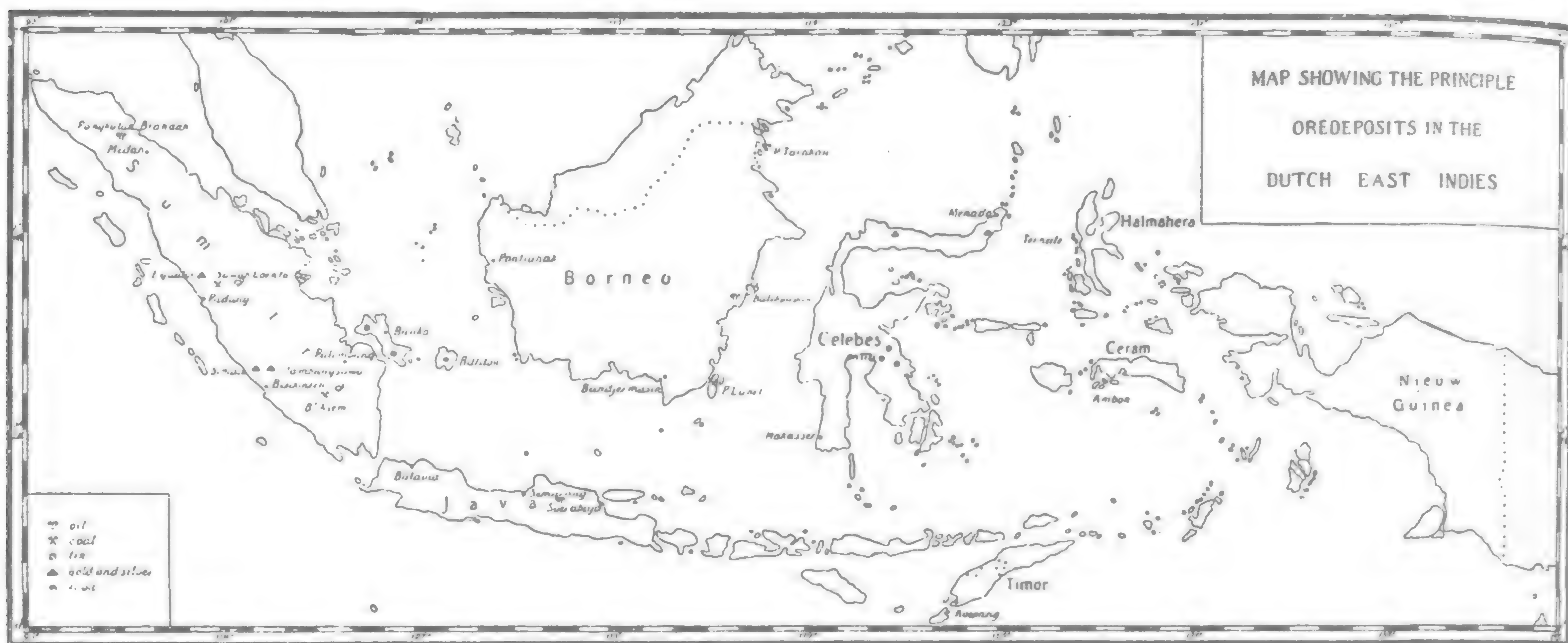
The annual manufacturing capacity of the Osaka Works is 120 locomotives, 1,500 steel freight cars, 8,000 tons of bridge beams, 250 various machine tools and about 10,000 h.p. of the Takuma water tube boilers. The capacity of the Tokyo Works is 250 bogie passenger coaches, 2,500 freight cars and 1,000 switch stands. In addition to the Honjo works at Tokyo, the company operates another branch works in Tokyo at Higashi Hirai-machi, in Fukagawa-ku.



Battery of Takuma Patent Water Tube Boilers with Automatic Stokers manufactured at the Kisha Seizo Kaisha, Osaka Works

The directors of the company are, Mr. Shigeji Imamura, Mr. Haruo Kuzuno, Mr. Kikichiro Okura and Mr. Sadakichi Tanabe, with Mr. Masao Shibusawa and Mr. Kikuo Aoki as auditors and Mr. Hiroshi Hiraoka as advisor. Mr. Shogo Hasegawa, doctor of engineering, acts as managing director. The Osaka head offices are under the management of Mr. Masasuke Izuna, and the Tokyo offices under Mr. Unjiro Saito.

Mining in the Netherlands East Indies



As can be seen at a glance the greater part of the ore deposits in the Indies are situated in the Outer Possessions. Indeed, though Java may be considered a rich country from an agricultural point of view, the other islands are exceedingly rich as to mineral wealth.

THE government mine service includes various activities, *i.e.*, geological surveying, prospecting for useful minerals, carrying on researches of mineralogical and metallurgical nature, locating and sinking wells for drinking water in deep layers, organizing and managing state mining industries and exercising regular legal supervision over private mining enterprises.

The results of the various operations are published in the year-book of the service. The first part is devoted to administrative, technical and statistical data, the second part to scientific essays.

The government mining industry includes the working of the collieries at Sawah Loentoh, at Tandjong (Sumatra), and at Poeloe Laoet, an island off the south-east coast of Borneo, the working of the tin mines on the island of Banka and of the gold and silver mines in Benkoolen (Sumatra).

Private parties wishing to exploit minerals must obtain a license to prospect and a concession, both subject to certain conditions regarding nationality, duration of the work, government taxes, security, transfer and government supervision, set forth in the Mining Act of 1899, which was revised in 1910 and again in 1919.

According to this latest revision, aside from rights already granted, no more concessions will be granted to private individuals for the so-called: (b) minerals (*i.e.*, anthracite and all kinds of mineral and brown-coal, petroleum, asphalt, earthwax and all other kinds of bituminous substances, solid as well as liquid and inflammable gases, the latter in so far as they are not of recent date (marsh gases), among which, also, iodine and allied substances are ranged.

The minerals named may henceforth be exploited only by the state itself, or by private parties according to an exploitation contract to be signed with the government on the basis of Article 54 of the Indian Mining Act (State Gazette 1910 No. 588), which agreement may only be signed by power of attorney fixed by law.

Concessions for the remaining minerals are still granted on the old basis. The working of minerals not mentioned in the Mining Act is also bound by a permit.

Connected with the head office of the mining service in Batavia is the mineralogical and geological museum of the East Indian Archipelago, to which anyone interested in the work may obtain admission on application.

Tin-Mining by the Government

The government tin mines, all of which are situated on the island of Banka, are the outcome of an agreement made for the supply of tin by the old East India Company with the Rajahs of Palembang, who in those days owned the island.

The mining which probably dates from 1710, was at first carried on by the Malay population. Soon, however, the Chinese took the industry in hand, in 1820 it was placed under European control by the Dutch East Indian government and since 1852 has been supervised by mining engineers trained in Europe. Originally these engineers were entrusted only with the topographical, geological and mineralogical survey of the island, but they have since been put in charge of the actual mining and smelting operations. They have introduced important improvements in the construction of smelting furnaces, the drainage of the open pits and the stripping of the overburden, so that the tin industry at Banka is now entirely up to date and making use of the latest technical inventions. Moreover, during the past few years the tin has been subjected to chemical test, before exported, so that the Banka stamp guarantees the quality of the product.

The island has an area of 12,240 square kilometers and extends over a length of 100 nautical miles. Most of the mines are situated on the north-east side of the island.

The ore is worked almost exclusively in open pits, which are found in the alluvial deposits of many riverbeds and in the alluvial strata on the slopes of small hills. Tin mining, therefore, cannot be regarded in the same sense as mining, which is usually considered as subterranean industry.

The strata from which the ore is obtained are from 0.1-0.4 m. in thickness, although in exceptional cases they are several metres.

The ore is first cleaned in washditches and is then generally smelted by each mine in its own smelting house by means of simple blast furnaces. In some districts there is a central smelting house for all the mines. It is planned to establish one central smelting furnace for all Banka.

The work is still done by Chinese coolies and is partly contracted for and partly carried out under the government's own management.

In the latter case the usual manual labor is made use of as well as machinery. In the year of report, 1918, 6.94 per cent. of the total production of tin was obtained under government supervision.

The average number of laborers (contract coolies) in the year of report, 1918, amounted to 18,658. Of the 13,330 laborers



Inclined Cable Track at entrance of the Sawah Loento Screening House

who had completed their contracts, about 15 per cent. returned to their own country.

Those sent back are accompanied by an official and a doctor.

In the above year the condition of health among the coolies was good. About 3.07 per cent. were treated in the hospitals. Owing to the nature of the work, sickness was chiefly due to malaria and skin disease.

The death rate amounted to 3.04 per cent., but 1.66 per cent. of this was due to influenza.

Very good results have been obtained by providing the coolies with unpolished rice by which berri-berri, a disease very prevalent in former years, is being gradually wiped out.

At the present time there are nine hospitals.

Since 1914 Banka tin has been sold almost exclusively in the Dutch East-Indies. The tin is sold underhand in Batavia, while a small part is supplied to various branches of service in Holland and the East-Indies.

In 1918 there were in Banka 325 tin mines, employing 18,638 laborers, producing 12,055 metric tons, of which 36 tons were auctioned in Holland.



Sawah Loento Coal Mine

Private Tin Mines

The chief private enterprise is that of the "Billiton Maatschappij" which works the tin in the island of Billiton.

In 1852 a concession was granted to the Billiton Maatschappij, and in 1892 was extended for a further period of thirty-five years. In the new agreement it is stipulated, that five-eighths of the yearly profits shall go to the government.

The geological formation and the occurrence of the ore are almost similar to those in Banka. In Billiton, however, there are also found veins of ore, which are rich enough to be worked.

As in Banka, the work is done by Chinese kongsies working under contract while the industry is organised along the same lines. In 1918 thirty mines were being worked.

Another private enterprise is the Singkep Tin Company, to which a concession was granted in 1889 on the island of that name in the Rhiau Archipelago.

The occurrence of the ore is similar to that in Banka and Billiton and the mines are worked according to almost the same system. In the hills are also found tunnel constructions.

Near Singkep tin ore is also found at the bottom of the sea, where it is worked by means of dredgers. The mud which is brought to the surface is put through a preliminary concentration on board and is then further worked on shore. The Singkep ore is smelted in Singapore.



Sawah Loento Coal Mine

In 1918 the production in tons was 6,945. The share in the profits paid by the Billiton Co. to the N.E.I. government was 5,689,538 guilders.

Coal

There are now three enterprises by the government: the Ombilin mines, the mine at Poeloe Laoet and the Boekit-Asem mines.

Ombilin Mines.—The Ombilin mines are situated near Sawah Loento in the Padang Highlands, a region very famous for its beautiful scenery. Mining was begun in 1892.

For transport a railway 156 kilometers in length was constructed. Owing to the mountainous nature of the country parts of the track are on the cogwheel system.

The coal field extends for 10 kilometers in length and has a breadth of 9 kilometers. The thickness of the seams varies, but is usually very great, some seams being as much as 23 metres.

The quantity of coal is estimated at $\pm 200,000,000$ metric tons, of which a total of 7,291,425 tons was extracted from 1892 to 1919.

The coal burns easily with a large, clear flame and only small quantities of ash and cinders.

The mines so far have been worked entirely by means of tunnel construction together with the use of all kinds of modern technical machinery.

Formerly the greater part of the production was sold to private buyers (in 1913 80 per cent., in 1914 76 per cent. of the total output), but during the war years, on account of the stagnation of foreign shipping, the government public services were supplied

in increasing measure; in 1916: 28 per cent., in 1917: 47.5 per cent., in 1918: 48.62 per cent.

The coal sold to private buyers is partly taken in at Emma-haven as bunker coal, partly shipped as freight coal to some place where it is sold as bunker coal. In 1918 it was shipped to Tandjong Priok, Sabang, Sourabaya and Macassar.

In order to provide for the need of coal which existed in the archipelago during the war years, production was run up as high as possible and as far as available means permitted.

The laborers are for a large part convicts undergoing penal servitude (natives and those holding the same rights, convicted for some crime).

At the end of 1918 their number amounted to 3,377, out of a total of 7,650 laborers.

On account of the continuous changing of these people, who must always be trained anew, the individual labor prestation of this class of laborers is naturally smaller than that of steady contract laborers and free working men. Favorable results are generally obtained by making contracts with released convicts who have a record for good conduct during their penal term.

The condition of health is generally more unfavorable among the convict laborers, since they are more susceptible to disease.

The island is favorably situated for the sale of the product, being in the direct route of the shipping lines between South Africa, Australia, Java, Macassar, China and Japan.

In 1918 162 ships called at Stagen.

In the year of report 96,606 tons of coal were shipped, of which 25.4 per cent. was delivered to private parties and 74.6 per cent. to government services and industries.

The work is chiefly done by Javanese contract coolies, the average strength of which in 1918 amounted to 2,639. An average of 5.53 per cent. were treated in the hospitals, while the death rate was 2.50 per cent. of which 2.24 per cent. from disease. The high death rate is a result of the prevalence of influenza and cholera.

The production which, from 1907 to October, 1913, amounted to 902,295 tons, was in 1913 126,885 tons, in 1914 128,505 tons, in 1915 117,710 tons, in 1916 124,105 tons, in 1917 120,834 tons, and in 1918 121,421 tons.

Boekit Asem Collieries.—This third government coal mine is situated near the doesoen Tandjoeng, 12 kilometers south-west of Moeara Enim in the Residency of Palembang.

For a long time it was known by various explorers that coal was to be found in the highlands of this province.



View of the Mill of the Redjang Lebong Company

The mortality resulting from sickness amounted to 10 per cent. among the contract laborers and 17.5 per cent. among the convicts.

The death rate resulting from accidents amounted to a total of 2.65 per cent. in 1914, against 1.59 per cent. in 1917 and 0.74 per cent. in 1918.

In 1918 no work was carried on at the coal brick factory, since there was a sufficient demand for fine sifted coal.

Following are some figures relating to the government coal mining industry:—

In 1918 the production in tons was 504,201. The book value of the enterprise in guilders was 4,595,053. The receipts in guilders were 7,029,395. The working expenses in guilders 6,370,174. Net profits after deducting share paid to the Sumatra R.R. in guilders were 659,131.

Poeloe Laoet.—On the island of Poeloe Laoet, off the south-east coast of Borneo, a colliery has been worked by the government since October 1st, 1913.

The whole island is reserved by the government for the purposes of mining and geological research.

The centre of the mining industry is at Stagen, which is connected with the harbor of Stagen by a railway five kilometers long.

The mining is carried on in two strata.

The proposed extension of the mines could not be carried out immediately, because of war conditions.

Originally little attention was paid to this fact because the mineral was brown-coal. By the proximity of volcanic rock (andesiet), however, the coal is here and there improved.

In the geological research of 1915 it appeared that great quantities of this improved coal were present near Tandjoeng.

Stoking tests gave favorable results, so that in connection with the existing coal shortage in the Dutch East-Indies and also to supply the government railroads in their need of fuel, it was decided to work one mine on a small scale by way of experiment. The work was confined to day labor in the day-seams of the so-called Mangoes strata. The coal produced was transported from Tandjoeng to Moeara Enim on a tramway, constructed in a short time by the government railway service, and after being transloaded into the cars of the South Sumatra government railway, brought to Palembang (Kertapati).

The refined coal is found in three layers, the upper so-called *Mangoes* layer, consisting of two banks 6 and 7 metres in thickness intersected by a tuff layer from 4 to 5 metres thick, the middle so-called *Soeban* layer, consisting of two banks of 6 and 3 metres intersected by a stratum of clay 2 metres thick and the lower so-called *Petai* layer from 5 to 6 metres thick. The layers are mutually separated by marl-slate and sandstone 20 metres thick between the Mangoes and Soeban layers and 25 metres thick between the Soeban and Petai layers. A fourth layer also occurs, i.e., the *Merapi* layer, at a depth of about 100 metres below the Petai layer.

The coal is very pure, containing not more than 3 per cent. of ashes, mostly 1-2 per cent. but some sorts show an inclination to become crushed. After an optional contract had been closed for the eventual taking over of the Lematang concessions situated in this region, these concessions and the adjacent grounds were investigated.

The result of this investigation was, that in the year 1919 the concession was taken over by the government.

The mining is principally limited to day labor in the Mangoes layer, the Soeban layer being worked for the first time in 1919. At present the coal is mined in three qualities: (1) a highly refined coal with about 8,000 calories heat value, (2) a coal less freed from gas and water and which therefore shows a greater solidity of from 6000 to 7000 calories, (3) a sort which is poorly refined and can not stand long storage of about 6200 calories.

The production amounted to 9764 tons in 1917 and in 1918 to 50,300 tons, while in 1919 more than 100,000 tons will be obtained.

Measures are now being taken for the construction of a colliery on a large scale.

Government Gold-Mining in Benkoolen

A mineralogical geological research instituted by the government proved the existence of two gold and silver deposits capable of being developed: Tambang Sawah and Lebong Simpang, both located in the division Lebong in the Residency of Benkoolen.

The Tambang Sawah deposit contains chiefly manganese-bearing silver ore, which will be worked according to a process discovered by the engineer Caron.

Because of war conditions the necessary test on a large scale could only be made in America, where they took place in the station for metallurgical research in Denver, with the co-operation and instruction of Professor Clevenger of the United States bureau of mines. The necessary machines were then ordered.

The delivery and erection of these installations are now being actively carried on.

During the time when the tests were being made, preliminary measures were already being taken on the location, while a road connecting the mine with the principal town of Moeara Aman was built by the service of the state public works.

By the service of waterpower and electricity an electric waterpower station was built at Tais to supply the mine with current. This powerhouse also has accommodation for supplying more power to the Redjang Lebong mine.

The machinery necessary for working the ore at Lebong Simpang is now being installed. The power will be supplied by a small waterpower station.

Private Gold-Mining. Other Minerals

From ancient times the East Indian islands have had the reputation of being rich in gold, Java included, though this is the only island where no gold mines are found, the metal being discovered only sporadically.

At the end of the last century private enterprise led to the discovery of a number of places where gold existed, the result of which was that several companies were formed for exploration and a few concessions, which did not turn out to be very profitable. The record of these companies on the whole has been unfavorable, but gradually sounder conditions have arisen.

Gold is found in Sumatra, Borneo and Celebes in all kinds of deposits, such as beach and alluvial deposits, tertiary gravel beds and as vein deposits.

By the end of 1918 54 concessions had been granted for the mining of gold and silver.

The mining of the gravel beds so far has been of small importance and the dredging companies, also have met with little success. Natives are employed in the washing of river sediment.

The more important mining companies confine themselves exclusively to the working of vein deposits.

The greatest quantity of gold is produced in the province of Benkoolen in Sumatra, where two mines are at present in working. The province West Coast of Sumatra, on the other hand, produces by far the most silver.

The mining area, known by the name of the Lebong district (Lebong mine), lies about 75 kilometers north of the capital and harbor of Benkoolen.

The veins sometimes extend as far as 4 kilometers. Water-power is everywhere available for the working of the ore.

Another gold-mining district is to be found in the northern peninsula of Celebes, which, however, so far has failed to live up to expectations. At the present time there are three mines in working.

A third gold centre is located in Central Sumatra near Padang, where the mines have been producing since 1913.

Silver mining in the archipelago is not an independent industry, being taken from the ore together with gold. The mines worked on the West Coast of Sumatra produce chiefly silver.

Among the other minerals found in the Dutch East-Indies, besides petroleum, mention must also be made of iodine, wolframite, manganese ore, sulphur and copper ore, and also diamonds in Borneo.

These mines are worked exclusively by private enterprise. Various springs in East Java produce iodine, which is shipped to Europe in the form of copper iodide. In 1915 the production amounted to 50.5 tons of 1000 kilograms, in 1916 to 33 tons and in 1917 to 15.4 tons.

Wolframite, manganese and sulphur are obtained in small quantities. The amounts of sulphur produced in 1911, 1912, 1913 and 1914, respectively, were 875, 305, 1,236 and 300 tons (1000 kilograms), while in the years 1915 up to and including 1918 only a very small amount was obtained.

Marble quarries are found in Java, from which the stone is worked into tiles, among other things. In 1918 the production amounted to 5,500 square metres.

There are also a number of lime kilns and manufactories for building materials. Near Padang a Portland cement factory has been established since 1911. In 1913 178,043 barrels of cement were produced, in 1914 213,483, in 1915 196,171, in 1916 229,923 and in 1917 204,264, which found a ready market. The factory has been enlarged with a second installation.

The results of the diamond digging in the archipelago suffered under war conditions in the second part of 1914. The greatest number of diamonds is found in the district of Martapoera in the South and East Division of Borneo.

The number of licences granted for diamond digging amounted in 1918 to 13,000 against 6,956 in 1917, 9,000 in 1916, 5,623 in 1915, 2,379 in 1914, 8,120 in 1913 and 6,049 in 1912.

Gold and Silver Production in Netherlands India in Kilograms.

	Gold kg.	Value in Glds.*	Silver kg.	Value in Glds.	Value of dia- mond produc- tion in Glds.
1910	4.847	7.935.913	15.977	666.952	—
1911	4.236	7.505.381	15.831	684.027	47.627
1912	4.002	6.594.120	14.258	697.125	52.518
1913	3.865	6.369.198	17.212	827.176	66.807
1914	3.503	5.772.941	32.555	1.434.229	48.762
1915	4.052	6.671.167	41.653	1.661.959	50.958
1916	3.814	6.285.631	37.516	1.980.967	77.613
1917	3.893	6.415.257	34.014	2.225.920	51.300
1918	2.971 †	4.896.906	28.626 †	2.220.206	116.360

* In calculating the value the gold value is taken at f 1648.00 per kg., while the silver value is calculated at the average market price in New York, which amounted in 1914 to \$0.5481, in 1915 to \$0.49684, in 1916 to \$0.6566, in 1917 to \$0.81417 and in 1918 to \$0.96772 per ounce or respectively to f 44.055, f 39.90, f 52.77, f 65.44 and f 78.12 per kg.

† Preliminary figure.

Coal Production in the Netherlands East Indies

OMBILIN-COAL MINES (*W. Sumatra*)

1919		Production in tons	Export		Delivered in bunker steamers at Emmahaven	
			Government	Others	Government	Others
January	...	38067	26956	7530	147	8668
February	...	33927	14790	900	287	8723
March	...	39674	14237	10150	210	13076
April	...	40667	14237	10150	210	13076
May	...	30214	18890	2040	96	13049
June	...	38702	20905	5070	134	9139
July	...	43093	8458	8310	168	9187
August	...	46572	8440	8722	131	12003
September	...	41780	17405	5570	147	10657
October	...	43708	23556	16830	445	13138
November	...	43208	17942	8865	315	9756
December	...	43266	21405	2915	72	5867
1920						
January	...	45090	13290	8659	161	11187
February	...	42361	10347	7500	357	11851
March	...	47553	27625	1170	88	12270
April	...	42372	17381	13455	162	11826
May	...	46550	8065	681	84	13646
June	...	47750	19828	4800	84	9577
July	...	51658	16068	13668	278	12484
August	...	49399	16524	2107	255	11481
September	...	49090	24205	9147	91	18108
October	...	50540	22014	4415	73	4915
November	...	45747	25537	2004	263	12583
December	...	49035	23130	1510	161	13592

PULU LAUT COAL MINES (*S. E. Borneo*)Preliminary Production Figures
1919-1920

			Quantities in 1000 Kgs.	
			1919	1920
1st Quarter	...	...	40.805	43.717
2nd "	...	...	46.775	45.463
3rd "	...	...	46.568	49.106
4th "	...	...	46.010	50.486
Year's Total			180.158	188.772

BUKIT-ASAM COAL MINES (*S. E. Sumatra*)

			Quantities in 1000 Kgs.	
			1919	1920
1st Quarter	...	...	18.290	27.662
2nd "	...	...	27.774	36.434
3rd "	...	...	30.185	36.946
4th "	...	...	29.684	37.225
Year's total			105.933	138.267

BANKA TIN MINES

Preliminary Production Figures
1919-1920

			Quantities in piculs.	
			1919	1920
1st Quarter	...	...	56.167	62.487
2nd "	...	...	31.199	38.654
3rd "	...	...	48.580	58.234
4th "	...	...	59.449	69.738
Year's total			195.395	229.113

Manchuria and Seattle

SEATTLE, June 2.—Equipment for the South Manchurian Railway, valued at \$125,000,000, will be exported through Seattle during the next four years, according to Yozo Tamura, American representative of the railway, who passed through Seattle recently. This promise of a vast volume of shipping for this port, coupled with the statement of Tamura that new mining equipment for the railway's mines will in the future be bought in the United States instead of Great Britain as at present, is greeted by shipping men as an indicator of a wave of trade that will sweep down on the port of Seattle and establish it in premier position on the Pacific Coast.

Another word of optimism was given by the Japanese railway man, when he said that in Manchuria, Seattle is by far the best known American city. Tamura also said his company is also working on a suggested plan that may involve in the future the shipping to Seattle of vast amounts of coal and iron from the mines of Manchuria. Tamura was in Seattle with a party of six American geologists and mining experts who are on their way to survey the holdings of the company. Before proceeding with extensive development plans the company wants to definitely establish the amount of wealth buried under the hills of Manchuria near Fushun and Laoyang. After a survey of the coal and iron ore deposits of the company, the party will return to this country in September. Tamura indicated that the vast development plans of the company would then proceed and the equipment in itself no small plum, would start moving through this port. The party will go from Dairen to Fushun. The output of the colliery is now 10,000 tons of coal daily. We hope, as a result of our investigations, to be able to increase this in a very short time to 20,000 tons daily. Following the inspection of the coal deposits the party will go to Liaoyang, which lies to the south of Fushun. There is located at this place an enormous deposit of low grade iron ore which has been estimated at 500,000,000 tons, available.

Prices Collapse in the Far East

Discussing the trade collapse in India, the Chartered Bank of India, Australia and China, Sir Montague C. Turner, presiding at the annual meeting in London, gave an impressive list of the depreciation in values between March 1, 1920, and the same date this year. The list is as follows:

			1920	1921	Per Cent.
				Dec.	
Cotton, per lb.	...	...	29.90d.	6.38d.	78
Jute, per ton	...	...	£ 70	£32	54
Hemp, per ton	...	...	76	40	47
Copra	...	...	72	32	55
Linseed	...	...	66-10	18	68
Rapeseed	...	...	51	15-5	71
Rubber (cr.), lb.	...	...	2s. 7d.	1s. 1d.	50
Rubber (Para)	...	...	2s. 7½d.	11½d.	62
Tin, per ton	...	...	£409-10	£159-10	61
Silk, per lb.	...	...	64s.	20 3d.	67
Shellac, per cwt.	...	...	825s.	300s.	63

He added that silver had fallen from 84d. per oz. to 32½d., or 61 per cent., and eastern exchanges as follows:

			Mar 1, 1920	Mar. 1, 1921	P. C.
Calcutta	...	...	...2s. 7d.	1s. 3½d.	50
Hongkong	...	...	...5s. 7d.	2s. 4¾d.	57
Shanghai	...	...	...8s. 7d.	3s. 2d.	63
Saigon	...	...	...6s. 4d.	2s. 3½d.	63
Manila	...	...	...2s. 10d.	2s. 2½d.	22

Irrigation in the Philippines

IN the latest report of the irrigation division of the bureau of public works, of which Mr. A. D. Williams is the chief engineer, it was pointed out that the absence of many of the engineers of the division in the military service had hampered greatly the activities of the division. The lack of technical personnel, together with high prices and the difficulty in obtaining materials during the first part of the present year continued to delay an active program for the construction of irrigation and waterworks projects. These conditions improved during the latter part of the year and permitted the division to substantially increase its activities.

Hydrographic Investigations

The hydrographic investigations which were resumed in 1918 were extended during the year to include most of the important streams for irrigation and power purposes on Luzon and in the Visayan Islands. A number of gaging stations were also established in the provinces of Cotabato and Lanao, Mindanao. There were a total of 108 permanent gaging stations in 23 provinces being main-

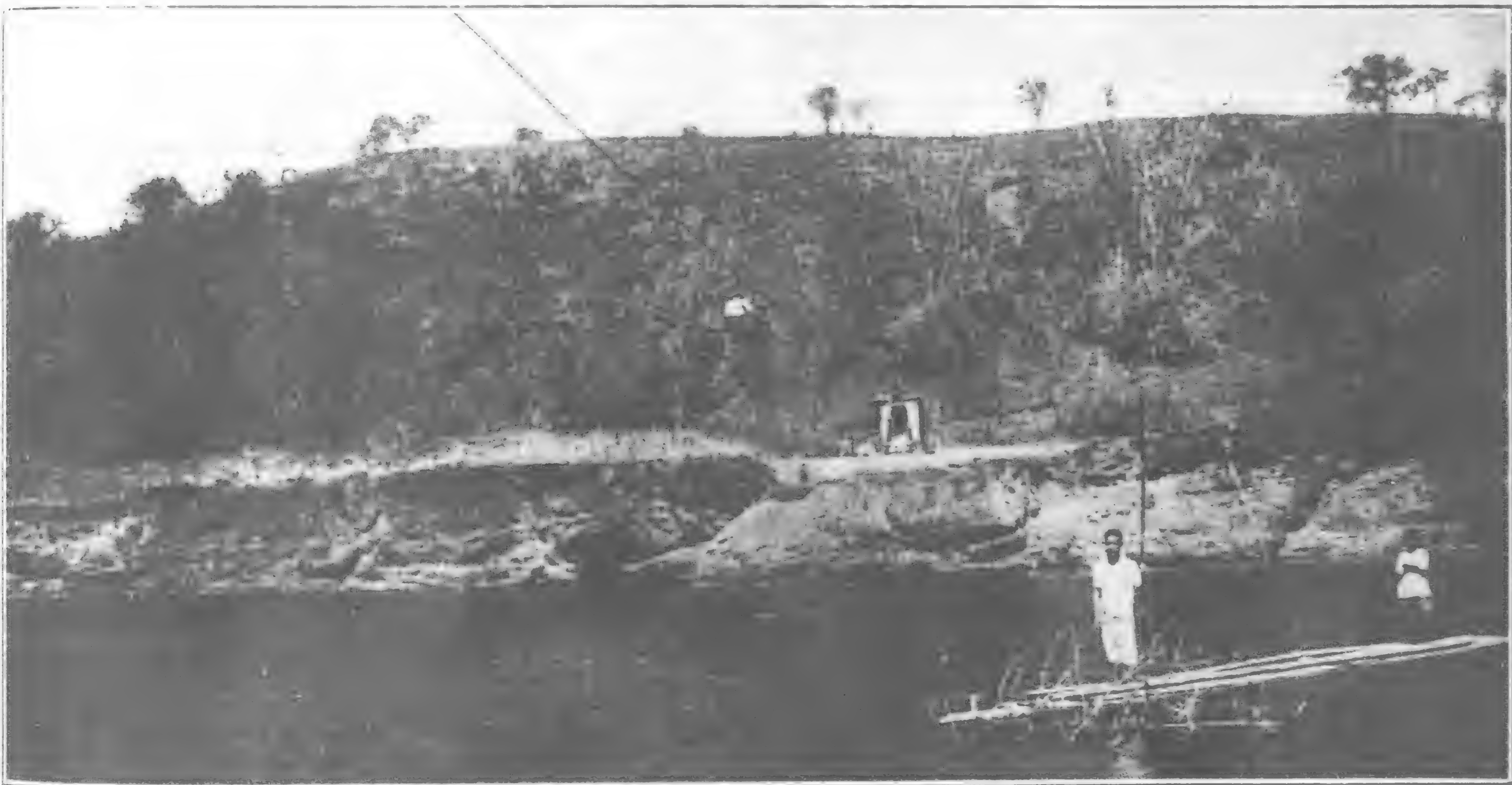
Topographic Surveys

During the year topographic surveys were completed of the following irrigation projects covering a total area of approximately 50,000 hectares :—

Naic Irrigation Project, Province of Cavite.
Laoag-Vintar Irrigation Project, Province of Ilocos Norte.
Talavera River Irrigation Project, Province of Nueva Ecija.
Mangatarem Irrigation Project, Province of Pangasinan.
San Fabian Irrigation Project, Province of Pangasinan.
Mariquina Valley Irrigation Project, Province of Rizal.
San Marcelino Irrigation Project, Province of Zambales.

The survey of the following projects is in progress with surveying parties still in field :—

Pauli Valley Irrigation Project, Province of Ambos Camarines.
Lanao Irrigation Project, Province of Bataan.
Maragondon Irrigation Project, Province of Cavite.
Candon Irrigation Project, Province of Ilocos Sur.
Pampanga River Irrigation Project, Province of Nueva Ecija.
Penaranda River Irrigation Project, Province of Nueva Ecija and Bulacan.
Murong Irrigation Project, Province of Nueva Vizcaya.



Cable Gaging Station on Augat River near Norzagaray, Bulacan Province

tained at the end of the year at which gagings were regularly made by hydrographers of the division. In addition to the operation of these stations miscellaneous gagings were made of 23 streams in connection with applications for water rights and the determination of old rights. Complete records, including data collected by the old irrigation division during 1908 to 1912, are now available for 23 gaging stations covering periods of from one to four years. In order that these records and other hydrographic data on hand be made more readily available for use in irrigation and power development by private parties it is recommended that they be compiled and published in bulletin form as is done in the United States and Hawaiian Islands.

The area of land to be irrigated by these projects is estimated at 45,000 hectares. The cost of making topographic surveys has averaged about P.0.75 per hectare.

Irrigation Projects Approved for Construction

Insular and municipal irrigation projects were approved for construction during the year under the provisions of Acts Nos. 2152 and 2755, respectively, as given on page 448. Allotments aggregating P.1,109,000 were authorized from funds appropriated by Acts Nos. 2736 and 2786 to start construction work. These

projects will irrigate a total area of 21,814 hectares and are estimated to cost completed P.2,378,500.

Project.	Province.	Irriga- tion area. Hec- tares.	Estimated cost.	Allotment author- ized.	Remarks.
Amburayan River ..	La Union ..	4,500	P.642,000	P.200,000	Insular system.
Baruyen River.	Ilocos Norte	1,000	56,000	56,000	Do.
Dingras.	do.	1,200	106,000	106,000	Do.
Santa Barbara.	Iloilo	4,000	436,000	250,000	Do.
Tagudin.	Ilocos Sur. .	1,300	100,000	100,000	Do.
Trinidad.	Benguet. .	200	40,000	40,000	Do.
Talavera River	Nueva Ecija	8,000	928,000	310,000	Do.
Dipolog.	Zamboanga.	1,000	42,000	28,000	Municipal system.
Ayala.	do.	183	7,500	5,000	Do.
Santa Maria.	do.	131	21,000	14,000	Do.
Total		21,814	2,378,500	1,109,000	



Trinidad Drainage Canal on Baguio-Trinidad Road

Plans have been prepared and construction work authorized on the Baruyen River, Santa Barbara, Trinidad, Dipolog, Ayala and Santa Maria projects. The necessary plans have also been prepared for starting the construction of the Talavera River irrigation project, but a protest received from a number of land owners against the inclusion of land irrigated by an old irrigation system has held up construction work. Recommendations have been submitted that the land served by the old project be excluded from the system to be constructed by the government. It is believed that this recommendation will meet with the approval of the majority of the interested land owners and will receive favorable action, in which case the construction of this project can be undertaken in accordance with the revised plans at an early date. Irrigation notices have been published and served on interested land owners for the remaining projects as required by law, and construction work may be authorized on same in accordance with the provisions of the Irrigation Act on or before February 15, 1920.

The district engineer organizations are being utilized in the construction of irrigation projects whenever the work can be handled to advantage in this manner. In the case of the larger projects which cannot be handled to advantage by district engineers, project engineers are assigned in charge of the work. The project engineers will work under the supervision of district engineers in most cases but in some instances it has been considered advisable to have them report directly to the chief of the irrigation division.

Funds for construction purposes are being deposited as a rule with provincial treasurers for disbursement under a special arrangement whereby provinces will be paid a surcharge of 1 per cent. for this service, making the total surcharge for insular projects, 10 per cent. For the larger projects special disbursing officers are required, especially when construction work is accomplished by administration.

In designing irrigation projects considerable attention has been given to developing standard plans for canal structures. This standardization of design will effect a great saving in time and expense in the preparation of plans in the future.

In addition to the irrigation projects approved for construction, the construction of the following municipal projects was recommended:—

- Pililla Irrigation Project, Province of Rizal.
- Morong Irrigation Project, Province of Rizal.
- Balaoan Irrigation Project, Province of La Union.
- San Fabian Irrigation Project, Province of Pangasinan.
- Mangatarem Irrigation Project, Province of Pangasinan.

All the above projects contemplate the improvement and extension of existing municipal irrigation systems and should therefore be financed under the provisions of Act No. 2755. The total estimated cost of construction of such projects is P.227,000 to irrigate an area of 6,600 hectares. Preliminary plans have been prepared and construction can be undertaken as soon as the municipalities concerned finance the cost of the proposed systems in accordance with the provisions of Act No. 2755.

Irrigation Projects Under Consideration

A large number of requests have been received during the year from provincial boards, municipal councils, and private parties for the investigation or construction of proposed irrigation systems. The division has given considerable time to furnishing information in connection with these requests. Where little or no data were available on proposed systems preliminary investigations have been made by district engineers or engineers of the division and reports submitted covering the importance and feasibility of systems. The more important projects under consideration with the hectareage and status of each are given in the table on page .

From that table it will be noted that the bureau has under consideration 45 important projects in 20 of the principal rice producing provinces that would benefit a total area of about 300,000 hectares. In addition to these projects there are a number of proposed irrigation systems pending investigation for which little or no data are available. Topographic surveys and preliminary investigations have been completed for 20 projects that cover a total area of approximately 130,000 hectares. In order that a more definite and systematic policy may be pursued in developing these projects, legislation is recommended that would provide funds to be invested in the construction of irrigation systems over a fixed period of years instead of depending on annual appropriations for this purpose. For some of the larger projects, it will take several years to make the necessary preliminary investigations, plans and estimates and from three to five years to accomplish construction work. The recent rice shortage has emphasized the importance of irrigation in the Philippines to insure the rice harvest and to increase the yield of rice.



Drainage Canal under Construction

Maintenance and Operation of Irrigation Systems

The San Miguel irrigation system in Tarlac province and the Pilar irrigation system in Bataan province were maintained and operated under the supervision of the division during the year at a cost of P.9,073.66 and P.1,450.47, respectively. The total income

from the San Miguel system was P.11,845 and the net income from the Pilar system, P.1,394.69. The San Miguel system suffered considerable damage in the August flood due to an island of sand forming in the river above the diversion weir and big trees lodging on the weir. This caused the river to destroy the up-stream protection dyke and to cut a new channel to the east of the head-works. A short section of the main canal and several canal structures were completely destroyed and a large amount of sand deposited in the main canal above the settling basin. It has been decided to make temporary repairs consisting of a pile dyke, to replace the earth dyke, and to force the river to fill in the new channel during the coming rainy season. If this plan is successful it will effect a considerable saving, since earth dykes with rock paving are estimated to cost over P.100,000. The "Compañia General de Tabacos de Filipinas," which own the land under the system was furnished a continuous supply of water by maintaining a temporary heading during the time that the main canal was being reconstructed to take water at the diversion weir, which was not damaged.

PROJECTS UNDER CONSIDERATION.

Province.	Project.	Estimated area. Hectares	Status.
Albay	Quinale Lake Bato project	6,000	Awaiting investigation.
do	Malinao-Tabaco project	600	Do.
Ambos	Colassi irrigation project	2,000	Do.
Camarines	Paulli valley irrigation project	10,000	Investigation in progress.
do	Barit River irrigation project	2,000	Awaiting investigation.
do	Uarus River irrigation project	2,000	Do.
Antique	Sibalom irrigation project	3,000	Preliminary survey completed.
Bataan	Dinalupihan irrigation project	2,500	Do.
do	Orion irrigation project	1,270	Topographic survey completed.
do	Lamao irrigation project	300	Investigation in progress.
Bulacan	Norzagaray irrigation project	30,000	Topographic survey completed.
Cavite	Naic Estate irrigation project	700	Recommended for construction.
do	Maragondon irrigation project	800	Investigation in progress.
Ilocos Norte	Laoag-Vintar irrigation project	3,000	Topographic survey completed.
do	San Nicolas irrigation project	4,000	Preliminary investigation, 1910.
Ilocos Sur	Abra River irrigation system	10,000	Topographic survey completed.
do	Candon irrigation project	3,000	Investigation in progress.
Boilo	Jalaur River irrigation project	18,500	Topographic survey completed.
do	Aganao River irrigation project	3,000	Do.
do	Pototan irrigation project	2,300	Survey and preliminary design made.
do	Cordova irrigation project	1,000	Topographic survey completed.
Isabela	Magat River irrigation project	40,000	Awaiting investigation.
La Union	Balaoan irrigation project	1,200	Recommended for construction.
do	Agoo-Tubao irrigation project	2,000	Awaiting investigation.
do	Naguilian irrigation project	1,000	Do.
do	Rosario irrigation project	1,000	Investigation in progress.
Leyte	Barugo irrigation system	1,000	Preliminary survey made.
do	Dagami-Tanauan irrigation system	14,000	Preliminary investigation, 1910.
do	Bato-Hilongos irrigation project	3,500	Do.
Nueva Ecija	Pampanga River irrigation project	20,000	Investigation in progress.
do	Peñaranda irrigation system	10,000	Do.
Nueva	Murong irrigation project	800	Do.
Vizeaya	Binalbagan irrigation project	3,000	Awaiting investigation.
Occidental	Bago irrigation project	10,000	Do.
Negros	Silay irrigation system	5,000	Do.
do	Porac River irrigation project	1,000	Do.
Pampanga	Bamban River irrigation project	3,000	Do.
do	Gumain River irrigation project	5,000	Do.
Pangasinan	Agno River irrigation project	30,000	Topographic survey made, 1910.
do	Mangatarem irrigation project	2,000	Recommended for construction.
do	San Fabian irrigation project	4,000	Do.
Rizal	Mariquina Valley irrigation project	5,000	Topographic survey completed.
Tarlac	Capas irrigation project	5,000	Awaiting investigation.
do	Tarlac irrigation project	30,000	Do.
Zambales	San Marcelino irrigation project	4,000	Topographic survey completed.
Total		307,470	

Some repair work was performed on friar lands estates irrigation systems in the provinces of Cebu, Cavite and Laguna by the district engineers under the supervision of the division. The operation of these systems is under the bureau of lands.

Water Rights

The division received a total of 158 applications for water rights during the year for irrigation and industrial purposes. Twenty-four applications were considered, twenty-one of which were granted by the secretary of commerce and communications

and three disapproved, upon the recommendation of the irrigation council. The remaining applications have been advertised and investigated as required by law and are now pending action by the irrigation council. The water rights granted appertain to 1,162 hectares of irrigable land. A total of 417 applications for water rights have been granted since the passage of the irrigation act in 1912 for irrigating 50,353 hectares.

Of equal importance to the development of irrigation in the islands is the work that is being accomplished in the determination of existing water rights. Thus far complete adjudications have been made on eleven different streams involving 1,758 separate rights or parcels of land. These determinations affect the title to water for the irrigation of 8,032 hectares of land.

Surveys have been completed and maps prepared showing all water right locations on fourteen different streams. These surveys include approximately 50,000 hectares of irrigated land. The streams, including all their tributaries, which have been surveyed and are now pending adjudication are given in the following table:—

Stream.	Province.	Number of diversion ditches.	Length of main canal in metres.	Number of municipalities affected	Number of hectares irrigated.
Pilar	Bataan	5	9,900	1	1,453.8
Calaguiman	do	11	18,600	1	481.5
Pansol	do	4	300	1	41.4
Talisay	do	16	18,650	2	782.4
Sierra Bullones	Bohol	26	18,300	1	347.0
Maitim	Laguna	1	2,000	1	1,230.1
Ange	Pampanga	3	4,000	1	1,200.0
Gogo	do	24	42,270	4	4,000.0
Nayon	Pangasinan and Zambales	20	29,320	2	1,175.3
Bued	Pangasinan, Union and Mountain Province	50	33,180	6	5,136.0
Baliwag	Nueva Ecija and Tarlac	210	85,465	7	22,999.5
O'Donnel, Moriones and Tarlac	Tarlac	1	4	7	10,114.0
Total area					48,961.0

The division is at present several years behind in this work due to the lack of clerical and technical assistance. The system is simple, but the filing, indexing and tabulating of rights, and the correspondence with claimants, involve a large amount of clerical work which requires office assistants with several years experience.

The streams, in addition to those mentioned above which have been designated for adjudication on which no work has been accomplished are given in the following table:—

Stream.	Province.	Municipality affected.	Approximate land irrigated.
Nasisi	Albay	Ligao and Oas	1,000
Ynarihan	Ambos Camarines	Naga, Magarao and Cabalanga	1,200
Maoguingoguing	Ilocos Norte	Vintar	500
Nagsincacac	Ilocos Sur	Cabugao	300
Ubbog	do	do	200
Parasapas	Pangasinan	Tayug and Natividad	300
Gogo and Buge	Tarlac	Concepcion	1,000
Balingasay	Ilocos Norte	Sarrat	300
Banila	Pangasinan	Rosales, Balungao and Umingan	2,000
Total area			6,800

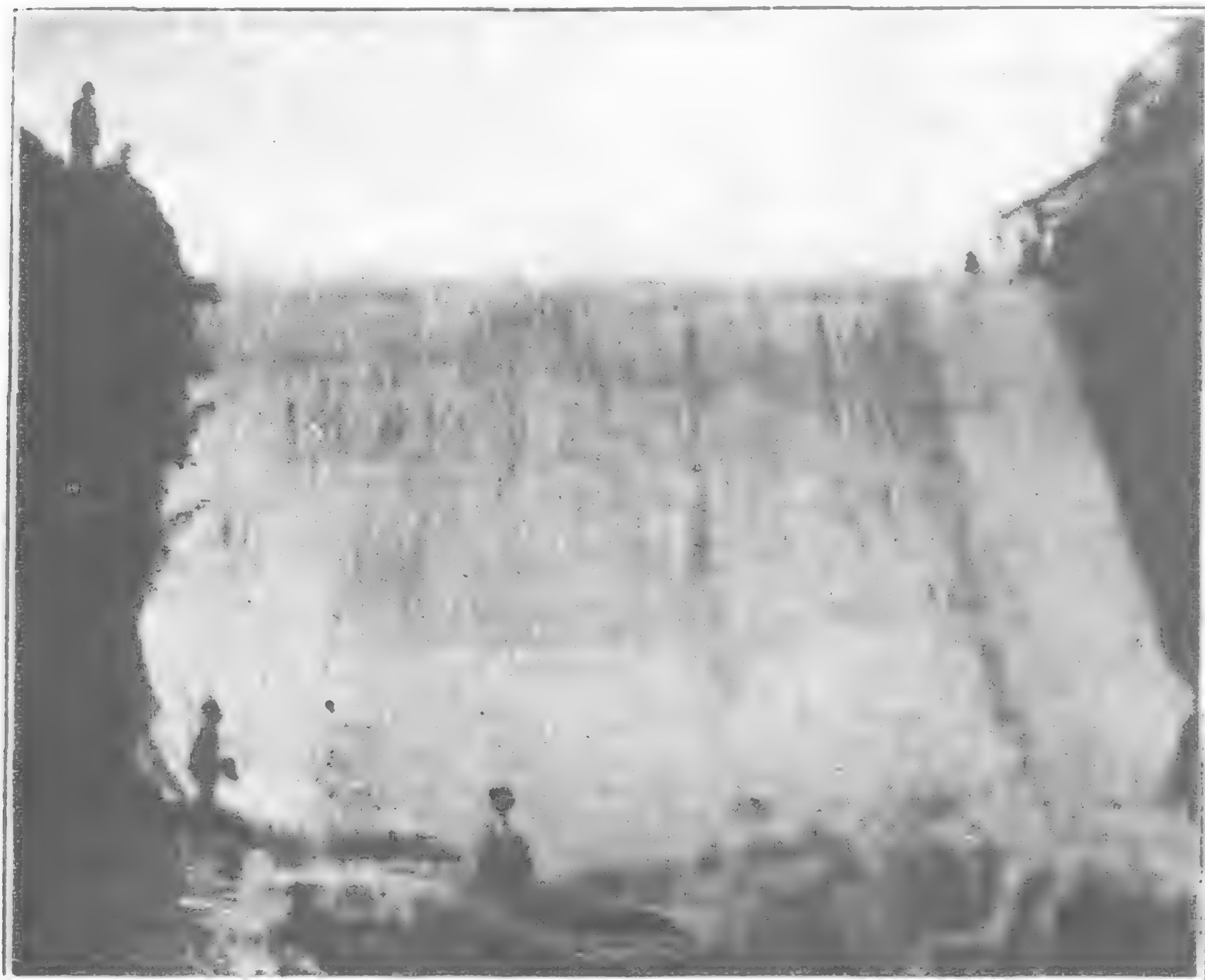
Amendment to Irrigations Law and Bond Issue for Irrigation Systems

A proposed act which will amend and compile the law relative to the appropriation of public waters for the development of water power and the use of public lands in relation thereto, and which would change the present policy of the government in allowing



Dam and Headworks, San Miguel Irrigation System, Tarlac Province

titles to waters and lands valuable for water power to pass permanently into the hands of private parties or corporations, and retain control of these valuable resources in the people though permitting their development and use through private enterprise, is another measure that deserves the preferential attention of our legislators



Masonry Dam on Friar Lands, Cavite Province

Such a proposed act, if it is to be submitted to the Philippine legislature, must be so worded as to provide a definite policy, which is essential, and should secure the capital needed for the proper development of water power sites as rapidly as the public interest may require.

In order to increase the food production of the islands and remedy the shortage of rice which has been experienced in the past, and at the same time help the provinces and municipalities construct irrigation system, a proposed act authorizing provinces and municipalities to incur indebtedness not to exceed seven per centum of the aggregate tax valuation of their property, and to issue bonds covering the amount of said indebtedness payable in gold coin of the United States or its equivalent in Philippine currency, for the purpose of providing funds to construct irrigation systems, should be passed.

Krupps to Build Steel Works in Chile

ACCORDING to reports from Chile, as published in the *Washington Post*, the Krupps have obtained concessions of enormous value from Chile for the purpose of establishing a branch plant of their German iron and steel and munition making industry. The Santiago papers are quoted as reporting that the amount to be expended for the purchase of an iron ore property, on which to base this industry, will be about \$10,000,000.

Krupp, it is said, has secured from the government of Chile through the negotiations of a German general a concession for nearly 500,000 acres of virgin forest land covered with gigantic trees. These papers also report that the Krupps propose to establish works on a scale even larger and better equipped than those at Essen. It is said that great secrecy was observed during the progress of these negotiations for fear of creating ill-will against Germany and the Krupps for undertaking so vast an operation in iron and steel and munition making in South America.

If the reports from Chile as to the magnitude of the undertaking and the concessions granted the Krupps are correct, this deal may become of international importance and of international danger.

In a report on business conditions in Germany the Guaranty Trust Co. of New York, which keeps in very close touch with the German situation, among other things says:

"Krupps are employing 12,000 more workmen now than in the month immediately before the outbreak of the war. This total does not include workmen in five other manufacturing undertakings which are controlled by, or work in alliance with, the Krupps. At Essen, in addition to the casting and rolling operations formerly carried out, 73 different kinds of machines, apparatus or technical articles are being produced. The Krupps cast steel works have been extended from a pre-war area of 242 acres to 1,400 acres, and the construction of railway material has reached enormous dimensions.

"German manufacturers are securing considerable orders in Argentina for fencing wire, rods, bars, billets, railway rolling stock, axles and wheels, and are offering prices with which no other country can compete. A German firm recently obtained an order for 4,300 tons of steel rails at prices far below American quotations and, in addition, the German makers are extending six months to one year credit to the buyers. Krupps recently obtained an order from Argentina for 10,000 steel wheels at a price of less than 50 gold pesos a wheel. Fourteen American, British and German manufacturers competed for the contract at prices ranging from 70 to 118 gold pesos a wheel.

"The Krupp concern has absorbed the Rhine Metalware and Machine Factory and that great war plant is now engaged in the manufacture of agricultural machinery and enamelware. Krupps control the Ernemann Works, Dresden (large manufacturers of cameras and moving picture apparatus), and also are specializing in the manufacture of cash registers, textile machinery and oil and sugar refining machinery."

The facts given here are indicative of the great industrial development under way in Germany and of the ability of that country to undersell the products of this and other countries. The fact that the Krupps are employing 12,000 more workmen than in the month before the outbreak of the war merely shows how little the industries of Germany really suffered by the war.

It is interesting also to note that the Krupps are becoming large manufacturers of cameras and moving picture apparatus. In view of the fact that German propaganda is preparing to flood this country through moving pictures disguised in such a way as to deceive almost the elect, but at the same time definitely intended to create a favorable impression for Germany and a spirit of hostility to our allies.

"Japanophobia"

Dr. Guy Potter Benton, president of the University of the Philippines, who has just returned to Manila from a trip of several weeks through Japan and China, cautions Americans against needless exhibitions of "Japanophobia." In a recent interview, he says:

"It is doubtless patriotic for American authorities to be alert in safeguarding our interests, but to a thoughtful observer the rabid Japanophobia manifested in some quarters seems hardly warranted.

"Of course, my passports were carefully examined, but there were no unpleasant features connected therewith. The fact that I was an American seemed to guarantee me the most respectful consideration. Although I have traveled in almost every country of the world, I came away from Japan feeling that never, anywhere on earth, had I received more generous treatment. Polite consideration and sincere helpfulness were manifested on every hand.

"There may, of course, be an undercurrent of opposition to us that was not apparent to me but I believe, as patriotic Americans, we should be on our guard against hasty conclusions formed by people passing rapidly through Japan."

The Rockefeller Foundation in Peking

IN the announcement of 1920-1921 it is stated that the Peking Union Medical College is open for the instruction of students, of both sexes, in the Medical School and the Pre-Medical School. The Medical School offers a five years' course in medicine, including one year of special work in the laboratories or hospital, and also provides facilities for graduate study in all the branches of medicine. The



Rockefeller Foundation Medical and Surgical Buildings

Pre-Medical School offers a three years' course in preparation for admission to the Medical School.

The Training School for Nurses will open for the admission of women students in October, 1920.



South Court. Showing Chemistry Building, etc.

History and Organization

The Union Medical College was founded early in 1906, following the disorganization of mission work that resulted from the Boxer outbreak. The American Board of Commissioners for Foreign Mission (Congregational), the Board of Foreign Missions of the Presbyterian Church in the United States of America, the London Missionary Society, and later the Peking University (Methodist), the Society for the Propagation of the Gospel (Anglican), and the

Medical Missionary Association of London, all co-operated in the development of the Medical College, and maintained it until 1915.

On July 1, 1915, the China Medical Board of the Rockefeller Foundation assumed the full support of the Union Medical College, having previously acquired the property of the college. The terms of the transfer provided, among other things, that the work of the college should be conducted by a Board of Trustees, which should consist of thirteen members, one to be appointed by each of the six missionary organizations previously maintaining the college, and seven by the China Medical Board. Early in 1916 the Trustees secured a provisional charter from the Regents of the University of the State of New York, and in accordance with this charter adopted by-laws and leased from the China Medical Board the property of the medical school in Peking.

The period from 1915 to 1920 has been one of reconstruction, both of the physical plant and of the organization of the teaching staff. This period has witnessed the opening of the Pre-Medical



Engine Room in the Power House

School, in 1917, and the opening of the Medical School, in 1919. Higher entrance requirements have been adopted, and each year has seen an increasing number of students entering the classes of the Pre-Medical School. It is hoped that the entire plant, including the new hospital, will be occupied by the autumn of 1921.

Buildings and Equipment

The Medical School group, in which most of the instruction during the first two years of the medical course is given, was opened in the fall of 1919, and comprises the first of the new buildings to be completed.

The new buildings are located on San Tiao Hutung, between Hatamen Street and Wang Fu Ching Street, in the property known as the Yü Wang Fu, which comprises approximately nine acres of land. All of the buildings necessary for instruction in the various branches of medicine, and for hospital purposes, are included in this group. These buildings are modern in every respect, and include the features and equipment necessary for elementary and advanced instruction in all of the medical sciences and clinical branches. A small private pavilion makes it possible for patients to secure the professional services of the staff without entering the public wards.

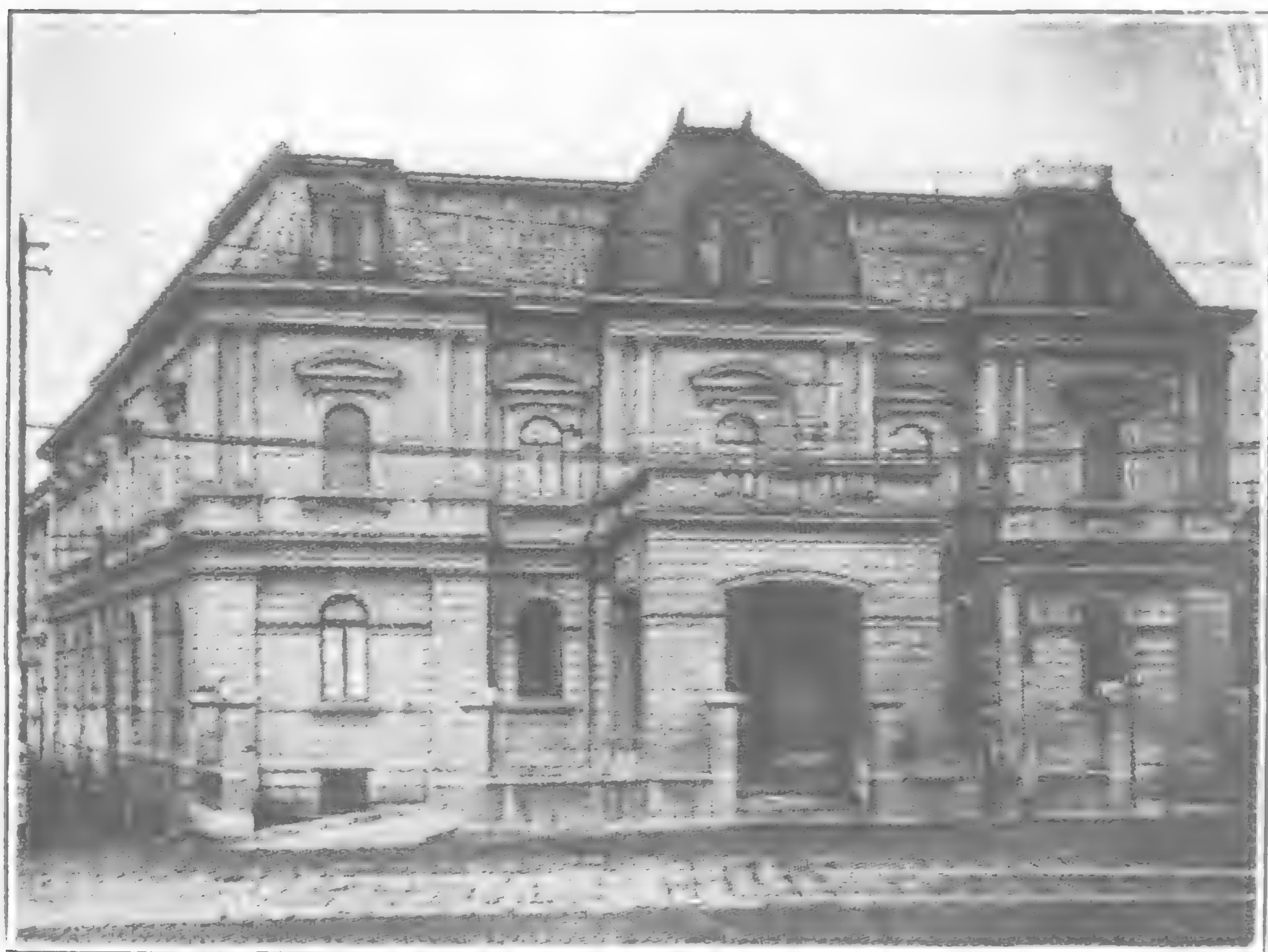
The Pre-Medical School, dormitories, and staff residences are situated within a few minutes' walk of the new buildings.

The Japanese Bill Market

JAPAN has passed through a serious financial reaction and weathered the storm. The reports of all the bank presidents for the last half of last year bear evidence to the close team work and co-operation existing between the Bank of Japan and the financiers and merchants of the country which enabled Japan to pull herself together and surmount what threatened for a time to become a panic. The reaction which set in during the first half of last year

of the firm. These commercial bills are evidence of "trade acceptances." The acceptance of the payee becomes valid when he or his representative (in case of a company) signs his name on the face of the bill, usually in the column reserved for acceptance. The commercial bill as a credit instrument eliminates the uncertainty and disadvantage of deferred payment by book account, and allows the holder to keep his funds in a liquid, readily negotiable condition. If a commercial bill bears names of high repute in banking circles, it can be discounted any time the holder desires by his bank or bill broker at a comparatively low rate of interest. The Central Bank (Bank of Japan) will discount the commercial bills at officially quoted rates, but the quality and quantity of commercial bills available for discount is limited by the credit of the bills themselves, and also to the extent that banks or bill brokers want the accommodation. The maturity of commercial bills is a matter of agreement, but they usually run for thirty, sixty or ninety days, according to the available commitment of the banker's funds.

The law governing commercial bills was first promulgated in 1882, under the title of "Regulation of Bills of Exchange and Promissory Notes." It was in force until 1893, when a part of the old "Commercial Code" was brought into operation. This was a temporary regulation, and after a thorough investigation and revision by a special committee a new "Commercial Code" was put in force from June, 1899. This is the code at present in force, but further important amendments were made in 1911. The Code contains a chapter on Bills (Tegata) which regulates the form of bills of exchange, promissory notes and checks, the rights of the holders, the obligations of drawers, accepters, payees and endorsers of these instruments, etc. Legally interpreted, bills of exchange and promissory notes are formal instruments, containing absolute, unconditional promises to pay the stated amounts, and in which the signatory incurs a liability without reference to the reason or motive inducing him to do this. The holder of these



The Tokyo Stock Exchange

resulted for a time in a state bordering on the chaotic, when the Bank of Japan stepped into the breach and warned the traders to dispose of their stocks and adjust their production while the bankers were advised to give more careful consideration to their advances. As a result, the banks became cautious and paid attention to the replenishment of their reserves so that by the latter half of the year cash in hand became so plentiful that many of them had to seek outlets for sound short term investments. There being a scarcity of gilt edged bills on the market a great demand was created for bank acceptances as well as for "stamped drafts"—the drafts so stamped being eligible for rediscount by the Bank of Japan. Such a state of affairs also afforded an excellent opportunity for the issue of government bonds and debentures, of which over Y.600,000,000 were issued during the last six months as against Y.400,000,000 for the first half year.

Commercial bills or trade acceptances in Japan form a large part of the bank transactions, and a very interesting description of this line of banking business was presented by Mr. Junkichi Miki, assistant manager of the Fujimoto Bill Brokers' Bank, Ltd., of Osaka in "The Street." As an introductory to his remarks on the bill market in Japan, Mr. Miki says that in so far as the Japanese money market is concerned, the commercial banks whose first function was to facilitate the commercial development of the country, made rapid progress during the past half century, and the custom of using commercial bills, in cases of deferred payment, has been instituted among the domestic traders by the discount service of those bankers.

The commercial bill is a credit instrument of deferred payment by which the sales of merchandise are settled. Such bills are created when the seller of merchandise draws a "bill of exchange" on the buyer for a stated amount, payable on a certain date as arranged, presents it to the latter and has it accepted by him; or the buyer of merchandise draws it on himself, accepts it and gives it to the seller, instead of cash payment or an account on the books



The Osaka Stock Exchange

instruments is protected still further by recourse to the special regulation known as "Exchange Action" (a documentary action) in the Code of Civil Procedure in case of non-payment at maturity.

We cannot overlook the important contribution of the large bill-broking bank to the development of the commercial bill market. With its specialized knowledge and experience in judging the credit standing of commercial bills and anticipating the future condition of the money market, it surpasses all others in discounting bills.

usually offering a lower rate of discount. The bill-broking bank also provides the banks with high grade commercial bills as the safest quick convertible investment, with the additional security of its own endorsement, and usually is able to offer bills of such amounts and maturities as the banks desire to discount.



Yokohama Specie Bank's Head Office

As the discount business of the bill-broking bank is carried partly by "call money" obtained from daily reserves or temporarily idle funds of banks in both city and country districts and sometimes by borrowing from the Bank of Japan to meet money stringency, it is obvious that the call money rate and the discount rate have a close relation on account of the demand and supply of money. Every day the bill-broking bank determines the rate both for call money and discounts on a reasonable basis, every factor which may influence the future condition of the money market being brought up for consideration. Therefore these rates have been recognized as one of the barometric indications of the money market.

Among commercial bills we have a special class called "spinning bills" (Boseki-Tegata). These bills, which carried the names of large spinning mills, appeared in the Osaka market after the Russo-Japanese war. As the spinning industry became prosperous, spinning bills have been treated as gilt-edged bills and always command the lowest rate obtainable. A large part of the spinning bills are discounted by bill-broking banks at lower rates than the official rate of the central bank on commercial bills and their rate is especially quoted as one of the money market rates.

Besides the commercial bill, the accommodation bill also has an important function as a means of financing commerce. The accommodation bill is a credit instrument which is not based on actual transactions in merchandise, but is created for the purpose of obtaining accommodation. The bill has various forms; some are drawn and accepted by the same firm (single name bill), others are drawn and accepted by different offices of the same firm, and still others are drawn and accepted by two or more affiliated concerns. If the accommodation bill has well-known and responsible names as signatories, there should be no hesitation in treating them in the same manner as commercial bills.

The practice of "Bank Acceptances" as a credit system was recently introduced to the Japanese money market by the Bank of Japan. It is obvious that the observation of the successful development of the acceptance in the London market and its recent application in the New York market led to the development of this new proposition. As the acceptance itself is a method of granting credit to the banker's customers, its idea and usefulness are more or less familiar to modern banking. In the amendment of the Bank Act and its rules in 1915, one of the new items inserted in the standard bank statement was "Acceptances" as liability and "Acceptances per contra" as assets. Services such as the issuing

of letters of credit, the guarantee of obligations or the lending of credit for accommodation were already performed in banks engaged in foreign exchange business. Yet the system of bank acceptances as a sound circulating credit medium did not exist until 1919.

The system of bank acceptances should be used for the purpose of financing foreign trade. The Yokohama Specie Bank, established in 1880, at present has a paid-up capital of Y.61,000,000 after the recent increase; and, extending its business to all the world with branch offices abroad, it has done splendid service for the development of Japanese foreign trade. The Bank of Taiwan (established in 1909) and the Bank of Chosen have been particularly engaged in the financing of trading with Oriental and South Sea countries and recently expanded their business to the Occidental world. These three banks are chartered banks organized under special regulations of the government, and are called in market terminology "Exchange Banks." Of course there are a few commercial banks and a few branch offices of foreign banks which are conducting a foreign exchange business, but to a lesser degree than the exchange banks.

During the European War the Exchange Bank, particularly the Yokohama Specie Bank, had great trouble in providing and distributing loanable funds. While the abnormal expansion of foreign trade and the immense favorable balance of exports over imports which Japan had never seen before, brought to the bank an increasing demand for financing traders, the large accumulation of cash in London and New York, resulting from collections, was tied up by the policy of embargoing gold shipments from those countries. Under these abnormal circumstances the bank had to provide funds by the following means:—

(1) Absorption of comparatively long-term call money from the money market. This has brought into the market the sharp fluctuation of call money rates.

(2) Borrowing from the "Exchange Loan" funds of the Bank of Japan, the total sum of which ranges from three hundred million to four hundred million yen. (The Yokohama Specie Bank has the privilege of borrowing Y.20,000,000 at the rate of 2 per cent.) The natural consequence of this action was the inflation of banknotes.

(3) The government bought the cash holdings abroad of the exchange banks with the proceeds of government bonds issued specially for this purpose. (The authorized total amount of these special exchequer bonds was Y.500,000; they were issued successively in 1917, 1918 and 1919.)

In order to meet the abnormal war conditions these means were fairly justified, but only as temporary expedients. The



The Mitsui Bank Building

inflation of banknotes resulting from the immense loans to the exchange bank, and the indifferent relationship between the exchange banks and the commercial banks were therefore seriously discussed with a view to changes.

In 1918 J. Inouye, Esq., the present president of the Bank

of Japan, then the president of the Yokohama Specie Bank, argued that the co-operation of the exchange banks and the commercial banks was absolutely necessary to solve the important problem of foreign trade financing, and suggested the establishment of a credit system of bank acceptances by which the resources of com-



The Home of the Bank of Japan

mercial banks would be fairly used in trade financing. A thorough investigation of the new system followed and finally in May, 1919, the Bank of Japan, after consultation with the influential commercial banks, announced that it would rediscount bank acceptance bills, as follows :

(1) For the improvement of foreign trade financing the Bank of Japan would rediscount bank acceptance bills based on actual transactions in trade, and favor such bills by the application of the same discount rate as on commercial bills, which are the lowest of official rates.—at that time 1.8 sen for Y.100 per day or an annual rate of about 6.5 per cent.

(2) For the financial maintenance or adjustment of industrial concerns which expanded during the war, the Bank of Japan would rediscount such accommodation bills of those concerns as are accepted by the banks, but only to the extent that the Bank of Japan judged proper, and to these bills it would apply the loan rate on bills secured by a stipulated kind of stock. The rate, at that time, was 2.0 sen for Y.100 per day, or about 7.3 per cent. annually.

The Bank of Japan recommended to the commercial banks to invest their reserves or idle funds in the usual short-term acceptance bills, the safest and most readily marketable instruments, and thus contribute to the development of foreign trade which is the cause of Japan's national prosperity.

The practical method of bank acceptances may be explained as follows :

In the case of imports of merchandise the banks issue letters of credit upon request of importers. The seller of the goods in the foreign country draws a draft when the merchandise is shipped, and later the banks accept the bill when presented. If branches of Japanese banks have bought the bill, it becomes the genuine bank acceptance bill.

In the case of exports of merchandise the practical use of bank acceptances is limited to some extent. This system is advantageous to banks engaged in exchange business only when, in the countries to which the merchandise is destined, the money rate is higher than in Japan or it is difficult to obtain the accommodation. It is advisable that the exporter make an arrangement with the banks engaged in exchange business such that, when he has shipped the goods and has delivered all necessary documents to the bank, the latter will accept his draft. Then the exporter can sell it easily to another bank or bill broker at a very favorable rate, sufficient to compensate for the commission paid for acceptance. This draft will be paid in maturity with the proceeds of discounting

the regular documentary draft, which is drawn at such a date as to enable the bank to collect the draft at its due date at the destination.

The system of "Bank Acceptances" is indeed an ideal channel for the co-operation of the exchange banks and commercial banks in foreign trade financing, thus providing the former with the continuous resources of loanable funds ; but under present circumstances the available volume of bank acceptance bills in the money market is considerably limited by the fact that in the case of imports from Occidental countries most of the drafts drawn by the foreign merchants bear the denomination of their own currency and also sometimes interest clauses (interest bills), according to the usage of long years. Such bills are obviously not as suitable to the money market as commercial bills for investment, unless special arrangement fixing the rate of exchange which is to convert the value of the draft to Japanese currency is made between the exchange banks and the lender of the money.

Regarding the bank acceptance bills of industrial corporations, some of them have been used to obtain revolving funds to finance the purchase of raw materials, others to mobilize the bank's loans by the substitution of acceptance bills, and still others to meet the temporary need of money until the paying of capital or the issue of bonds. Quite a large volume of such industrial bills with bank acceptances had already appeared in the market in 1918.

After the formulation of the acceptance system by the Bank of Japan, around fifty million yen of bank acceptance bills was sold to the market quite rapidly and the bill-broking bank has done a remarkable service in the campaign of marketing these bills. It is recalled that in December, 1918, the bank acceptance bills drawn by the Kawasaki Dockyard for the purpose of refunding its deposits in London was offered to the market through the Fujimoto Bill Brokers' Bank, the first appearance of genuine bank acceptance bills based on foreign trade in the history of the Japanese money market.

Even with the special features of import bills explained above, it was still difficult to release the exchange banks from tying up loaned money. The weekly statements of the Bank of Japan, even after the adoption of the new plan, have shown that the "Exchange Loan" (mostly the loan to the Yokohama Specie Bank) was always ranging above the three hundred and fifty million yen level, in spite of the decline in the favorable trade balance in the first half of 1919.

In August, 1919, the Bank of Japan announced that it would commence the rediscount of specially arranged bills drawn by the Yokohama Specie Bank on commercial bills at official rates. These bills are secured by export bills which have been sent to London or New York for collection and are stamped on the face by the Bank of Japan as evidence that they are available for rediscount. Of course this plan was intended to provide the Yokohama Specie Bank with further loanable funds, and these so-called "Bank of Japan Stamped Bills" were offered to the market at the rate of around 6½ to 7 per cent. in the first instance.

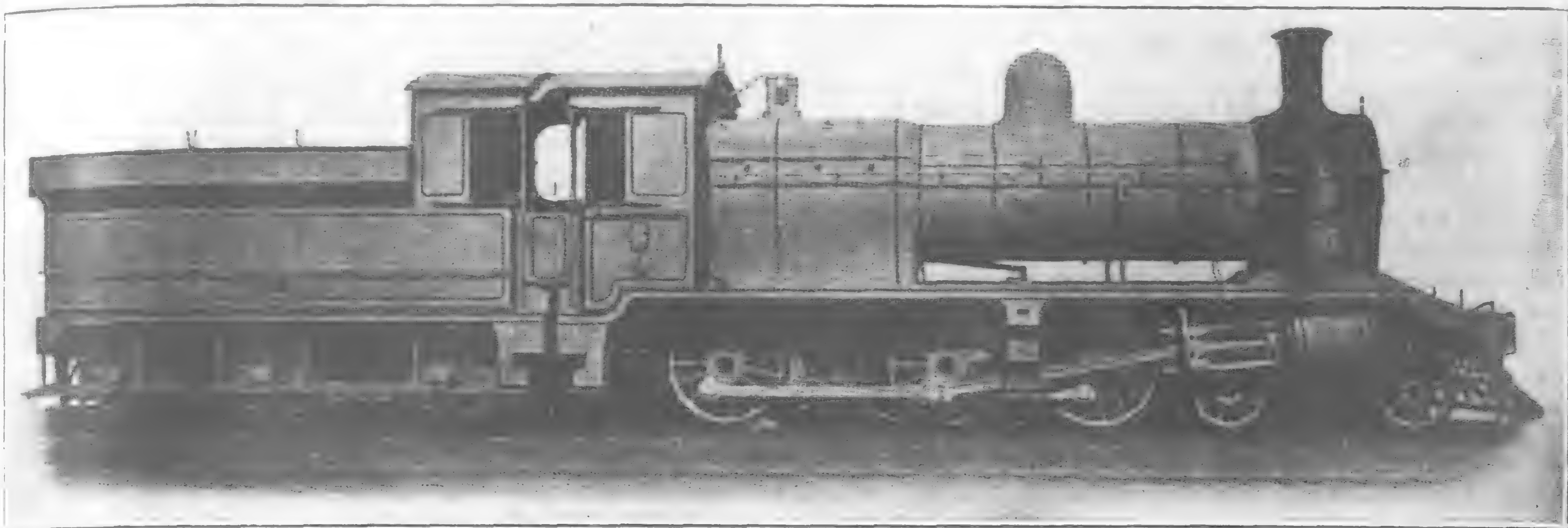
Beginning with September, 1919, the money market tightened, and from October to December the Bank of Japan raised its official money rates three times, its purpose being to reconcile them with the higher market rate on the one hand and the deflation of currency as well as the curtailment of over-speculation on the other. The present rates are 2.2 to 2.4 sen per day or 8 to 8.7 per cent., the lowest for the discounting of commercial bills, the highest for loans on specified stocks.

It is said that the money stringency in the latter half of 1919 has been a serious obstacle to the development of the bank acceptance system which has just started, but we are assured that money will become somewhat easier later on and the old customs in the field of import trade will be gradually swept away so as to favor Japanese importers. Within a few years we will have a growing acceptance market as a channel of sound short-matured investment for the bankers' reserve funds.

British Locomotives for the S. N. R.

THE arrival and quick erection of six new locomotives in Shanghai recently marks the re-instatement of British rolling stock on China's railways. After a seven years' absence from the market British merchants have been successful in securing orders for the six locomotives mentioned above being the last shipment in

a lot of thirteen. The locomotives above were manufactured by the North British Locomotive Company, Ltd. represented in Shanghai by Messrs. Jardine, Matheson & Co., Ltd. and were purchased by the Shanghai-Nanking Railway. The type of locomotive, together with its main dimensions, is shown below.



TYPE 4-6-0.

ENGINE.

TENDER.

Cylinders ... { Diameter 18-in. Stroke 26-in.				Heating Surface { Tubes ... 1,467 sq. ft. Firebox ... 163 .. Total... .. <u>1,630</u> ..				Wheels, Diameter ... 3-ft. 6-in.			
Wheels ... { Coupled, Diameter 4-ft. 9-in. Bogie, .. 3-ft. 0-in.				Firegrate Area 28 ..				Wheel-Base 13-ft. 0-in.			
Wheel-Base { Rigid 13-ft. 9-in. Total 24-ft. 11-in.				Boiler Feed 2 Injectors No. 8				Tank Capacity ... 3,500 gallons.			
				Traction Force at 75% of Boiler Pressure } ... 19,950-lbs.				Fuel Space 315 cub. ft.			
Working Pressure ... 180-lbs. per sq. in.				Weight { In Working Order 60 tons 6 cwt. On Coupled Wheels 46 .. 7 ..				Weight, Full ... 42 tons 5 cwt.			

ENGINE AND TENDER.

Boiler Plates, Steel.

Firebox Plates, Copper.

Tubes, Brass.

Wheel-Base, Total ... 48-ft. 6-in.

World Demand for Locomotives

SIR W. G. Armstrong Whitworth & Co., Ltd., of London at present have in hand an order for 200 locomotives from the Belgian State Railways, secured in the face of sharp foreign competition. The entire contract given out by the Belgian government amounted to 350 locomotives, and it had practically been decided that this should go to a foreign competitor. The British firm, however, was at the last moment able to obtain the major portion of these.

In conversation with a Press representative a member of the firm said they had always made a point of going abroad after fresh markets. To bring work into the country the contract in question had been taken at a strongly competitive price which was a little advance of that quoted by the foreign rival. "The quality of our work, however," he continued, "was the deciding factor. Many of the workers in our locomotive department are old 'gun men,' who, of course, have always been accustomed to the highest class of work. The work being turned out now is as good if not better than before the war, whilst as far as we are concerned the workers are beginning to give a higher output, though there is still room for improvement in this respect. The order for 200 locomotives from

Belgium is but a portion of those we have on hand. India, the Argentine, Java, Ireland, Trinidad and South Africa amongst other countries are to-day on our books. Considering it was less than eighteen months ago when we delivered our first locomotive, the development in this branch speaks well for the skill and thoroughness of the British worker. In 1919 we employed 800 men in our locomotive department at Scotswood; to-day there are 3,000, and more will be required. There will be an increasing demand for locomotives from all parts of the world, and given cheaper coal and materials, together with a higher output per man, we shall have little to fear from foreign competitors, and Great Britain should supply a very large proportion of this demand.

"Germany, without doubt, is the competitor most to be feared. Not only does that country turn out a good class of work, but it is helped by the rate of exchange and the low cost of production. Under present conditions Germany is able to undercut us very considerably."

In addition to turning out large numbers of new locomotives, Messrs. Armstrong Whitworth have signed a contract for repair of Russian locomotives. This work will be undertaken in Great Britain, and alone will give employment to 2,000 men for five years. The engines will be shipped over to Russia at the rate of 300 yearly.

The Far Eastern Review

A Monthly Review of Far Eastern Trade, Finance and Engineering, Dedicated to the Industrial Development and advancement of Trade in Far Eastern Countries

ENGINEERING FINANCE COMMERCE

5 JINKEE ROAD, SHANGHAI, CHINA

Telegraphic Address: Farview, Shanghai

SHANGHAI, JULY, 1921.

The Anglo-Japanese Alliance

China's Protest

IN all the agitations surrounding the question of whether or no the Anglo-Japanese alliance should be continued, very little thought has been wasted on the original reasons for its existence. Those who have been loudest in denouncing the pact should read carefully the "Memoirs of Count Witte" published in *World's Work*, parts of which we have already reprinted in order to throw light on the Far Eastern problem. Especial attention should be paid to the closing chapter of these memoirs, in which Count Witte says:

"At one point in my negotiations with the Japanese for peace I became aware that we could obtain better terms if the peace treaty were complemented with a treaty of alliance with Japan. Very cautiously I alluded to the matter and received an evasive answer from Komura. It was clear, however, that the Japanese were not averse to a partial alliance with us. I telegraphed to Count Lamsdorff that, in my opinion, the negotiations should be conducted with a view to a Russo-Japanese alliance. As the minister's reply was evasive and rather hostile to my suggestion, I dropped the matter. And so, when the parley was over, we parted from the Japanese not as friends determined to support each other, but as enemies who had agreed to suspend the struggle for an indefinite period of time.

"On returning to Russia I perceived why my suggestion had not been welcomed by the government. As a matter of fact, in those days the idea of revanche prevailed among a considerable number of influential people, mostly speculators enriched by the war. It was preached by such powerful organs of the press as *Novoye Vremya* and favored by the highest court circles, including the emperor. One of the chief agencies of the revanche movement was the committee on state defense, presided over by Grand Duke Nikolai Nikolaievich. It actually took under consideration a number of measures aiming at the realization of the revanche dream.

"Premier Stolypin was, of course, with the militarists. He conceived the plan of building the Amur Railroad, so that we might have a railway which, running within Russian territory, would be secure from seizure by the Japanese. The project was laid before the Duma, and was welcomed by the notorous defense committee, headed by Guchkev. In order to impress the Duma with the necessity of the road, it was told that war with Japan was imminent and that it would indeed break out not later than 1911 or 1912, at the latest.

"And so the Duma authorized the construction of this line, which will constitute a heavy financial burden on the Russian people and which will in the end bring nothing but harm. Under the influence of the same argument the imperial council, too, gave its consent. I vigorously opposed the project, pointing out that in the event of war the new road would not be any safer from seizure by the Japanese than the Eastern-Chinese Railway. Besides, I argued, the railway would increase the influence of the Chinese in the Amur province to a dangerous extent. Above all, I insisted, the new line meant the expenditure of huge sums which could be spent, with better results, on defending our Far Eastern possessions and the existing Eastern-Chinese Railroad. But my arguments were in vain."

We hold to the belief that the ideals of a people cannot be overturned in a day by political revolution, and, when a stable government is restored, Russia will resume her traditional diplomacy and outlook upon Asiatic problems. In the mass of publicity about the Russian people, there is a book from the pen of former United States Senator Beveridge entitled "The Advance of Russia," which Americans should read. Written in 1900, it clearly revealed the workings of a race-mind whose fanatical ideals contributed largely to the catastrophe of 1914. Other powers cannot ignore these national characteristics in attempting to provide against future contingencies. Let us therefore remember what Senator Beveridge had to say about the idealism of the Russians and what it means in terms of international politics.

"Deeper than this idealism in the soul of this strange people is religion; and then call to mind the passion for order, its devotion to mere form; and

with this, recall again that, buffeted for centuries by Asiatics on the east, by other Asiatics on the south, by warlike Europeans on the west, Russia has been compelled to develop a foreign statesmanship, unnecessary and unknown to any other nation, and a diplomacy skilful and resourceful beyond that of any other people of ancient or modern times. Take all these things into account and you have the great springs and sources whence flow the two sovereign ideals of the Russian people.

"These two ideals, are, first, the preservation of religious faith, and when the rest of the disputing world shall have grown weary of its spiritual conflicts, the restoration of that simple faith to all mankind; and the second is like unto the first—namely, the preservation of order, form and authority in civil affairs, and when the rest of the world shall have completed its cycle of liberty, and then license, and finally anarchy (which is what the Russians believe we are doing) to restore to the confused, hopeless, struggling peoples of the earth those forms of social order and political authority which the Slav thinks, are, after all, the foundation stones of civilization.

"Incident to this last is the more immediate Russian idealistic purpose of spreading her dominions over all of Asia, to the Russian mind, China is to be Russian, Persia is to be Russian, India is to be Russian. It is Russian power which is to restore the Cross to Jerusalem. It is Holy Russia that is to bring the authority of His faith to the land where the Saviour of mankind walked and taught and was crucified. So thinks the Russian.

"Russia was to carry the Cross to China. Japan was to be placed in vassalage. India was to become a Russian colony."

We cannot close our minds to the testimony of Count Witte. Russia expected to resume the conflict with Japan not later than 1912, and to pave the way she amputated Mongolia from China, to facilitate an attack upon Japan from the rear. These stern facts will stand and weigh in the balance against the hysterical protests of the Chinese against a renewal of the alliance.

There is an alternative to the Anglo-Japanese alliance. Given a strong China, able to defend her neutrality and fulfill her international obligations, the Anglo-Japanese alliance or any other similar pact relating to the Far East could be relegated into the limbo of forgotten things. China asks to have a voice in the preparation of any instrument that affects her status. Her wishes should be given most respectful consideration. Every effort should be made to conciliate the Chinese people. They are not altogether responsible for the ineptitude of their rulers, whose venality gave rise to this common impulse on the part of Britain and Japan to protect themselves against a powerful enemy, with whom the rulers of China had entered into a secret alliance.

If China can guarantee that her territory will never again be used as a bridge over which foreign armies can march to the attack of Japan and India, she is entitled to a place in the ranks of the great powers. In fact, when she can provide this guarantee, she will be the great power of the world.

The Chinese object to the phrase in the treaty which guarantees the integrity and sovereignty of their country. They should be taken at their word and called upon to assume their full share of the responsibilities for the maintenance of the peace of Asia. They should be invited to place their house in order, establish some form of stable government, reform their currency and laws, and above all, provide those guarantees which will obviate forever the necessity of an understanding between other great powers concerning the status of their country. The government of China, through its publicists, propagandists, mercantile and student bodies, has placed itself on record as opposed to a renewal of the alliance, but gives no assurance that it will assume the burden that the other nations lay down. Can China furnish that guaranty? Will the mercantile guilds, student bodies and bureaus of information, supplement their telegraphic protests by some sort of acceptable assurance that the Chinese army will reconquer Mongolia and preserve to the race the lands required for its expansion?

No matter how much one may sympathize with the patient Chinese people and those of its rulers who are honestly trying to apply reforms, the truth sticks out on all sides that until the military grafters are thrown out of power and a proper government established that will maintain law and order, guarantee the lives and properties of foreigners, and bring about some semblance of prosperity, the appeals of the guilds and students will fail to receive that consideration that otherwise would be due them. It is a sad sight when the mercantile and student bodies of a nation, led by a few agitators, usurp the authority of government and notify foreign cabinets if their wishes are not complied with, a commercial boycott will follow.

The recognized government of a people may not invoke such a threat in diplomatic intercourse without dire consequences. The picture presented in China reveals the existence of a paper government at Peking, holding no authority outside the walls of the capital, lacking funds, diplomatic prestige and an army and navy to enforce respect for its rights, a derelict amongst the nations. On the other hand paid agents of this government, working through mercantile guilds and student bodies, have established a sort of super-government employing the boycott as a weapon to enforce compliance with their ideas.

It is a dangerous situation. The weapon has been employed in the past against America and Japan and is now waved over Great Britain. To-morrow it may be France, or America's turn, if these nations fail to live up to the super-government's conception of the rights of China.

* * *

Dangerous Propaganda

Brings Ruin to American and Foreign Commerce in China

THE 1920 report of the commissioner of customs for the port of Shanghai makes interesting reading. As usual in these pithy reviews of treaty port trade conditions, the officials of the maritime customs keep close to facts, without elaboration. Commissioner Gordon Lowder states that "the prosperity of the preceding year (1919) brought many new firms and dealers into the market, and it was largely the inexperience and rashness of these latter which brought about the final catastrophe." Is this statement a correct diagnosis of the causes which led up to the recent business panic? Very few new British firms entered the China market during 1919. The above official statement would seem therefore to imply that the catastrophe was precipitated by the large influx of new American firms lacking knowledge of local conditions and inexperienced in established trade practices and the mysteries of silver exchange.

This is not the first criticism that has appeared in the Far Eastern press directed against American methods, and it is well for Americans at home to know more about the causes which led up to the rush to open offices in China. THE FAR EASTERN REVIEW has refrained from any participation in the campaign to induce American manufacturers to come to China, inclining to a belief, founded on eighteen years' experience, that any great influx of new firms could result only in disaster and a loss of business prestige. We have watched, therefore, with interest, and without comment, the activities of others along these lines and wondered just how far they met with the approval of the few old established American hongs.

It would serve no good purpose to review at length the ramifications of this campaign, as many of the activities, such as those entered into by Mr. Julean Arnold, the American commercial attaché, was an honest effort to build up American trade and prestige in China. However, there were other influences at work closely allied with dangerous political propaganda, whose impulses did not spring from such disinterested motives. It was essential that new American firms should establish themselves in China in order to hold a fair share of the trade which came to them by reason of the war, but at the same time it was the duty of government officials, trade advisers, and chambers of commerce to point out to the manufacturers the peculiarities of the market and the necessity of adopting a fixed policy in order to profit permanently from the opening. Instead of this there seems to have been a sort of tacit understanding that everybody should work together to "get them out here" and let them learn by experience.

This policy was perhaps best expressed by ex-Minister Reinsch, who, on his arrival in San Francisco in October 1919, declared in his first interview with the press, that "now while China and Japan are at odds over the Shantung question, Americans can skim the

cream off China's immense import and export trade." He followed this remarkable undiplomatic statement by adding, "China is one of the very few big powers which is absolutely solvent and can pay for what she buys with spot cash if she so desires." Is it any wonder, after listening to this kind of official talk, that Americans prepared to garner the pickings while the picking was good? One week after making the above statement, Mr. Reinsch was telling the bankers of Wall Street that China needed at once a loan of \$200,000,000 in order to disband 800,000 surplus soldiers, build railways and dig irrigation canals. This was typical of the reckless propaganda unloaded on the American manufacturer in order to get them to come to China. Americans were invited to enter the market, not to establish themselves firmly and learn the intricacies of trade, but to "skim off the cream" by taking advantage of the boycott against Japanese goods. Americans responded. They skimmed the cream, and left the sour milk for those who have to remain and face the consequences. There is no use of closing our eyes to a situation, which even the American commercial attaché at Peking was forced to take cognizance of by requesting that all new American firms or their representatives arriving in China, should bring with them proper credentials in order to receive the support of his office. If Americans are to succeed in China, a new program must be adopted.

Coincident with the activities of Mr. Reinsch, American newspapers were deluged with a mass of free literature from a new organization in Shanghai called the "China Bureau of Public Information," presided over by Dr. F. C. Tong, and managed by an American named Geo. E. Sokolsky. The trend of the press campaign conducted by this organization was openly anti-Japanese and appealed to American firms to seize the opportunity to enter the field. We saw also the China office of the American government committee of public information, directed during the war by anti-Japanese writers, transformed into a commercial news organization, supported by leading American interests in Shanghai. It was not long before the new enterprise had a representative with an office in the Woolworth building in New York, sending out circulars inviting American manufacturers to open offices in China. The circular declared that the work of the agency had the full support of the American mercantile community of Shanghai and declared that only by entering the market in force could American trade succeed. "In numbers there is strength," it added, "only in this manner can Americans overcome foreign competition." The circular then offered to furnish American manufacturers with confidential and expert reports on any and all kinds of business opportunities in China in return for a very modest annual subscription. The circular in question received considerable publicity in New York newspapers.

There were other agencies of which we will have occasion to speak at some future time, working in complete harmony to bring Americans into the field in force, and the evidence all points to a common leadership. To our knowledge, not one of the "publicity experts" in this commercial campaign had ever received a business training. They were all new-comers in China, the traditional "griffins" handing out wisdom to American manufacturers in order to get their business. The burden of their song was, "come in, boys, the water's fine. All we need is numbers and the trade of China is ours."

On resuming direction of THE FAR EASTERN REVIEW after his discharge from the American army, the publisher of this magazine declined to subscribe to this campaign. We could not understand how the older established American hongs in China, familiar with conditions and the difficulty of competing with established foreign interests in normal times, could endorse a campaign, which, on its face, could result not only in disaster to the new surplus American firm, but bring loss and discredit upon themselves.

For eighteen years it has been the consistent policy of THE FAR EASTERN REVIEW to tell the American and British manufacturer the exact truth about opportunities for new business in China. We have refused to influence advertising by holding out

alluring prospects of profits. Invariably we have counselled those who came to us for advice (and they were many) to go slow, and entrust their agency to some responsible firm. Most of the larger American and British firms in China have benefitted by our policy. We knew China and its possibilities for engineering business, and we could look ahead to the time when the campaign launched by irresponsible publicity bureaus would have its inevitable reaction.

It is needless to stress the point. Enough articles have appeared in the American press during the past year to convince the most skeptical that the campaign was overdone. Misguided Americans who rushed to the new commercial "Eldorado," returned home richer in experience, disappointed, and in many instances, bitterly resentful for the manner in which they had been misled. It would serve no good purpose at this time to mention specific instances or quote names. One of our leading steel traders on his return from China last year declared publicly that it would take his own company at least ten years before they would be able to overcome the antagonism engendered against America as a result of the practices employed by irresponsible get-rich-quickers who swarmed into China in response to the hip-hip hurrah-come-in-boys-the-water's-fine campaign.

The aftermath of this hullabaloo campaign is now before us. It has remained for the commissioner of customs to tell a truth that others could not express because of the inquisitorial methods now practiced to suppress free thought and honest criticism in American papers published in China. American interests have been injured, American prestige dragged in the dust, in order that a few propagandists and irresponsible, self-styled engineering and commercial experts, might thrive. The inexperience of these "griffins" has helped to bring disaster to the entire community. We are paying the price of dampfool publicity.

* * *

Profits in the China Trade

IN a speech delivered at the convention of the National Association of Manufacturers in New York on May 17, Mr. Iuming C. Suez, Chinese consul in that city, gave his views of American trade with his country. Mr. Suez evidently failed to consult with any of the high American advisers to China before drafting his speech, and said things, which, if true, would greatly embarrass American firms in China. In the opinion of Mr. Suez while Americans have splendid organizations for marketing their products elsewhere, they have none for China.

"Standardization of products is one of the essentials of foreign trade," said Mr. Suez. "You have attained it to a remarkable degree at home; for the China trade you have not standardized your products and their prices to meet the popular demand in China. A method should be found to lower the cost of production of American goods to be sold in China. The purchasing power of the Chinese masses is comparatively low, and will remain low unless their earning power is enhanced by the development of China's resources and industries.

"Another factor enters into our consideration of standardization. From reliable sources it is ascertained that American import houses in China consider a profit of 30 per cent. to 25 per cent. entirely justified; whereas British houses would be satisfied with 20 per cent. to 15 per cent. French and other European houses with 15 per cent. to 10 per cent. German and Austrian houses with 10 per cent. to 2½ per cent. and Japanese concerns with 5 per cent. to ½ per cent.

"The reason for exacting a wider margin of profit is probably due to the fact that American houses consider their business transactions as accidental and do not look for a continual flow of business or for standing orders. That the Japanese traders can afford to take less profit is clear, for the distance and the time involved to complete a transaction is short and the turnover is quick. In-

deed, the import business in China is conducted on a turnover basis, depending on a large turnover at a small margin of profit. A standard for profit marking should therefore be set to enable you to compete successfully. Another matter for standardization would be the terms and conditions of contracts. American merchants are typically obliging in making concessions when terms and conditions of contracts are discussed without reference to home offices and manufacturers, and would rather go by default and be exacting afterwards; whereas European merchants would be very strict and exacting in the initial stage of the transaction, and be reasonable and obliging afterwards, thus making provision for concessions when occasion arises.

"The Chinese business men would invariably prefer to do business on the basis of being a mean man in the initial stage and a gentleman throughout the transaction, meaning thereby, driving as hard a bargain as a mean man could in the beginning, but living up to the bargain as a gentleman. You have to conform with Chinese standards as well as with some European standards."

At least one American by the name of F. W. Cox, who has lived in Shanghai, promptly corrected the impression made by the consul of China, in a letter to the *New York Times*, in which he said that "when a statement like this is made by a Chinese diplomat, before such a body of men, it is a very serious matter. In fact, it would mean the deathknell of our export business to China, if correct.

"Inasmuch as there is no closer buyer in the world than the Chinese and we have always been able to do considerable business with them, this of itself would seem to disprove the statement. However, it is too serious to depend on this disproval alone, as it is not at all unlikely that it will be used as a basis of propaganda by our competitors.

"There is no difference in profits demanded by British and Americans, and to the best of my information very little, if any, with others, where the service rendered is the same. The fact is that in some cases Americans have gone to considerable expense to furnish expert help and service: in such cases profits must be such as to take care of this extra burden."

It would seem that here is a very good opportunity for American business men in China to conduct a propaganda of education amongst their friends in high Chinese official circles. It hardly seems like playing the game to have the representative of the Chinese government in New York misrepresenting their abilities and profits when Americans are active in boosting the cause of China.

* * *

The Right Spirit

ON the occasion of signing the contract in New York for the construction of an electrically-driven ship by an American shipbuilding company for the Japanese navy, a dinner was held at the Hotel Biltmore and the usual exchange of complimentary speeches took place. Captain Yokura of the Japanese navy who signed the contract on behalf of his government, struck the right note when he declared, "as our commercial relations increase, the bonds of friendship will be strengthened." In referring to the present tension over the Island of Yap, Judge Elbert Gary, chairman of the board of directors of the United States Steel Corporation, said that all nations were selfish when their material interests were concerned, but that that was no reason why they should not be friendly. "A man who had a full stomach does not appreciate the hunger of another who has not enough to eat," he said. "A man with money in his pocket is not apt to have naturally the same sympathy for a poor man that one poor man has for another.

"Now, if Japan needs an island in the Pacific, she has a perfect right to express to the world that she needs it and would like to have it. That does not mean that she is entitled to it.

"It is claimed that we have certain interests growing out of the cable situation in Yap, and Japan is in need of Yap. She is in need of some other islands there. I am not going to discuss here what took place between Japan and England and some other foreign countries, but I would like to impress this point.

"Simply because the United States desires to maintain forever certain rights there or because Japan needs to maintain forever certain rights there, does not settle the question, and it is nothing against either of the parties interested because either of them makes certain claims. It is a matter of disposing of all of these questions in an open, fair, frank and honorable way.

"Can any of you tell me when the United States or any other country has ever asked Japan to sit down at a table and discuss any question of disagreement when Japan was not perfectly willing to sit down and talk it out, generally waiving more or less of the things she believed she was entitled to? Could anything be fairer or more just than that?

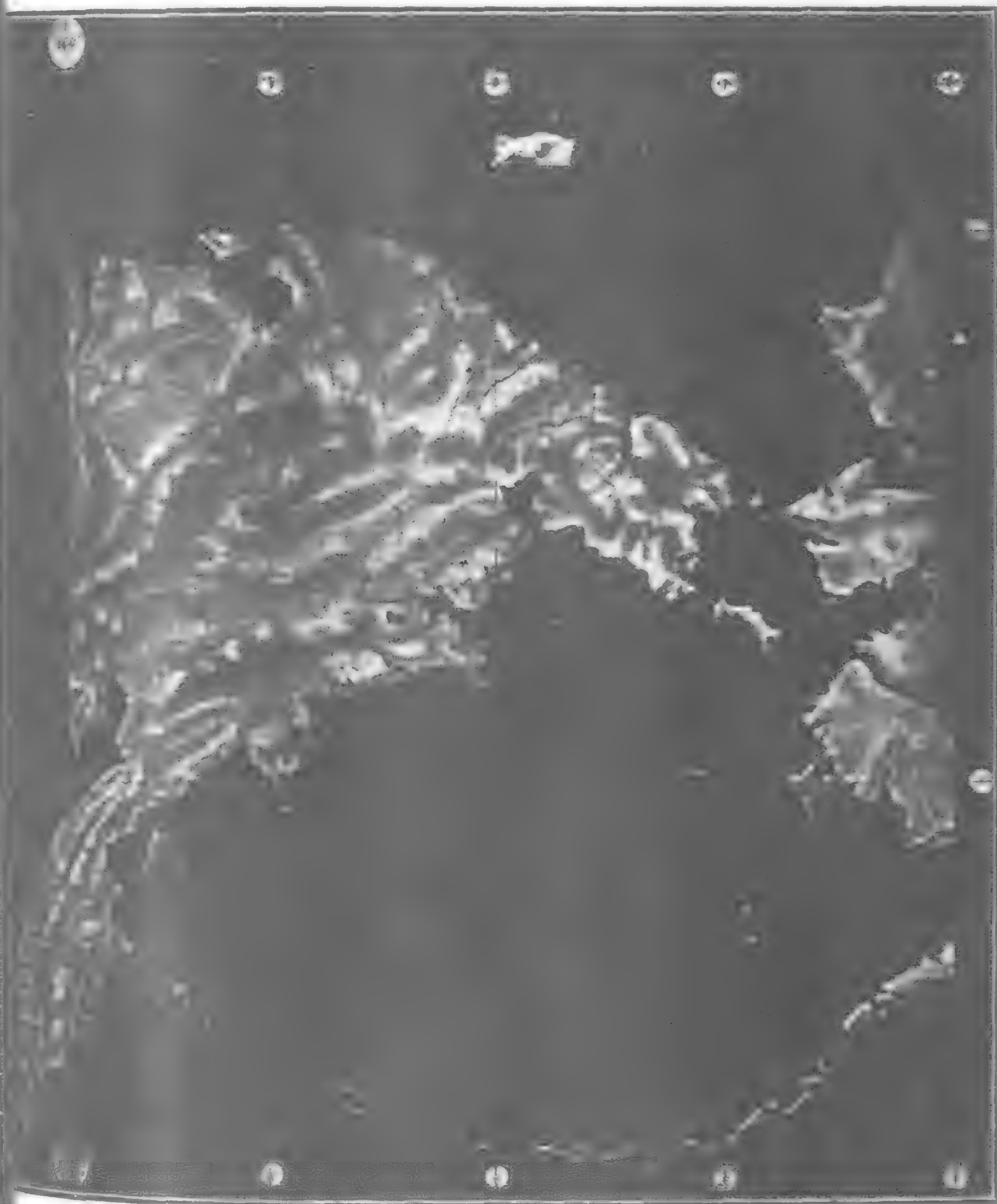
"So far as I am concerned, I want to say that, until Japan does something that seems to me to be intentionally wrong or unfair, I am going to be the friend of Japan."

A sensible American, is Judge Elbert Gary.

* * *

A Russian Warning

THE following interesting sidelight on American flirtation with the development of Siberia, comes from a little monthly magazine edited and published at the consulate of Russia at San Francisco, called "Siberian Opportunities." It says:



Relief Map of the "Vanderlip Concession" in Eastern Siberia

"There has been much speculation recently about the areas 'granted' to Mr. Washington D. Vanderlip by the group of irresponsible communists at Moscow. This concession, judging from what is known at present, has been received with the understanding that American capital would enjoy exceptional rights in Soviet

Russia where no Russian capital can be invested, where all private property is nationalized and where no individual is expected to have any commercial, industrial or even private business.

"It is understood that the local Russian governments, who consider that the Vanderlip concession lies in their dependency, have expressed themselves hostilely toward any transaction in land beyond the reach of the commissaries of Moscow.

"The American Russian chamber of commerce expresses itself in the January number of its economic bulletin as follows:

"Speaking of using a long spoon when one sups with the devil, it is interesting to note Lenin's statement concerning the much advertised Kamchatka concession of Washington B. Vanderlip. On November 23, a month after Vanderlip left Russia, Lenin made a long address before the Moscow district conference of the Russian communist party, which was duly reported in the official Soviet newspaper, *Pravda*, a copy of which has just come to hand. In the course of this address, Lenin said:

"The differences between our enemies have recently increased, particularly in connection with the proposed concession to be granted to a group of American capitalist sharks, headed by a multi-millionaire who reckons upon grouping around himself a number of other multi-millionaires. Now all the communications coming from the Far East bear testimony to the fact that there is a feeling of extreme bitterness in Japan in connection with this agreement, although the latter has not been signed yet and is so far only a draft."

"There seems to be a striking divergence between Vanderlip and Lenin. Vanderlip claims that he has a concession duly signed; Lenin says it is only a draft, not yet signed. Poor Vanderlip! —easy dupe and blind propaganda tool. The merest tyro could have advised him better on Soviet business methods.

"This will give our readers another point of view on this matter. The apparent inconsistency of dealing with people and laughing at them at the same time is the usual bolshevik method of conducting business. Where millions of American dollars are to be invested, this duplicity becomes rather disquieting.

* * *

The Press Congress of the World

PLANS for the holding of the great press congress of the world in Honolulu from October 4th to 14th, 1921 are now rapidly taking shape. From a description of what the committee intend will take place it seems that no effort will be spared to make of the congress a time of good fellowship, a time of gay festivity, as well as a time when much will be accomplished in the way of more serious work. Honolulu itself offers much to visitors and the people of Honolulu are by no means backward in their hospitality so that it may safely be assured that the pressmen of the world assembled there in October will enjoy a time perhaps to be unexcelled again. To mention a few of the delights which await them there is surf-riding, automobile rides around the spectacular mountains that overlook the no less spectacular valleys of the Island of Oahu, visits to the noted Haleiwa Hotel, trips in glass-bottomed boats and other events too numerous to mention.

Another feature that will prove of great interest will undoubtedly take the form of visits to some of Honolulu's schools, for it is here that the process of handling the well-being of the melting pot of the Pacific is best exemplified. It is recorded that in one school alone there are more than twenty distinct nationalities, and it is no uncommon sight to see a dozen and more different types of costumes upon children of an equal number of races in the same grade.

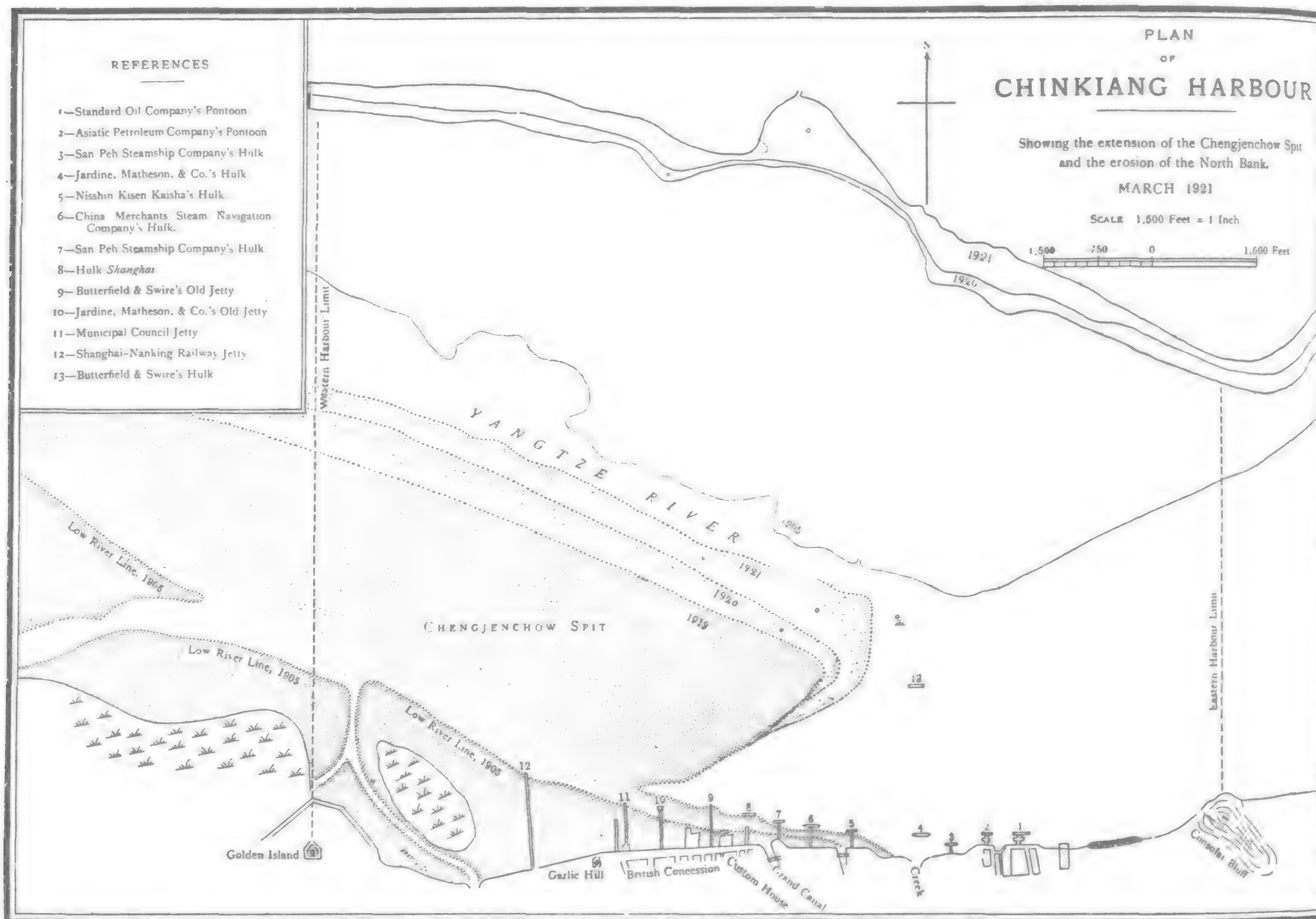
But of course there is more in store. Visits will be made to the other islands of the Hawaiian group famous for their remarkable beauty and interest. Favored indeed are the pressmen who will be able to partake of the program, but barely outlined here.

An Appeal to the Deaf

The Commissioner of Customs at Chinkiang Sounds the Warning to a Grave Danger

THE following report on the state of the Yangtze River at Chinkiang should be read in connection with the article on the opposite page describing the plan of an American engineer for permanent Chinese famine relief through flood prevention works on the Yellow River. Now comes the commissioner of customs at Chinkiang and tells us that the work of Mr. Freeman and others will be worthless unless attention is first paid to the training of the mightier Yangtze, which, if permitted to work out its own will, may some day break through its northern banks at that point and sweep

a map of China will show what this would mean. The present northern limit of the Chengjenchow bank practically coincides with the line of the north bank of the river in 1905, and is now over a mile away from the Bund-line of the British Concession. The condition of the river and the urgent necessity of taking steps to prevent its further deterioration formed the subject of resolutions passed by the conferences of British chambers of commerce, in China and Hongkong, held at Shanghai in 1919 and 1920; but these sound recommendations have apparently been overlooked. This is most unfortunate in view of the immense volume of trade



over the plains of northeastern Kiangsu and combine with the flood waters of the Hwai River, with consequences that will stagger humanity in its toll of human lives.

“Though it was hoped that some attention would be paid to the deterioration of the Yangtze River generally, and particularly to the present condition of this port—which, at the moment, is probably the worst sufferer from years of neglect,—it is recorded, with regret, that nothing has been done to improve matters. The mudbank, known as the Chengjenchow Spit, continues to grow in extent and solidity; and the attached chart, showing its progressive development during the past 16 years, and the naturally simultaneous erosion of the north bank of the river, indicates clearly that, unless some measures are immediately taken to stabilise the river, there is a serious probability of the Yangtze doing what the Yellow River did between 1854 and 1856, and finding a new mouth for itself far to the north-east of the present channel. A glance at

in the Yangtze Valley, and the enormous losses in business and revenue that would result from even a temporary diversion of the navigable channel of the river towards the north-eastern coast of this province (Kiangsu), which would appear to be inevitable, unless prompt action is taken to prevent such a catastrophe. It is very important that a commission should be appointed without delay to go into the whole question of improving the Yangtze and its tributaries and preventing further deterioration, pending the elaboration by leading conservancy experts of a general scheme of conservancy and the appointment of a permanent staff, and the necessary machinery, for the maintenance of the waterways which form the Yangtze Valley water system. Though steps have been taken to improve certain rivers and harbors in China, nothing has been done for the Yangtze, the most important waterway in the country. As far as can be ascertained there is not a single dredger on the river.”

Permanent Chinese Famine Relief

AFTER many years of discussion, the great plans for the Hwai River conservancy and Grand Canal improvement have resulted in another and perhaps more feasible and economical scheme devised by John R. Freeman, consulting engineer for the American International Corporation. One wonders if anything will ever come of these earnest and painstaking surveys to benefit China? It is easy to go back to the Hwai Valley famine of 1911 which took its

would be built two parallel ditches, each 75 feet wide, within the five-mile-wide stretch now protected on both sides by dikes. The outer sides of the ditches would be of stone and concrete. In the flood season the waters of the river, flowing in these ditches, would eat away the intervening 800 feet of soil and would make for itself a permanent bed. The stone and concrete of the outer sides would keep the water from washing away land in that direction. Under this plan the river would eventually have a width of about 1,000 feet, including the ditches and the 800 feet in between.

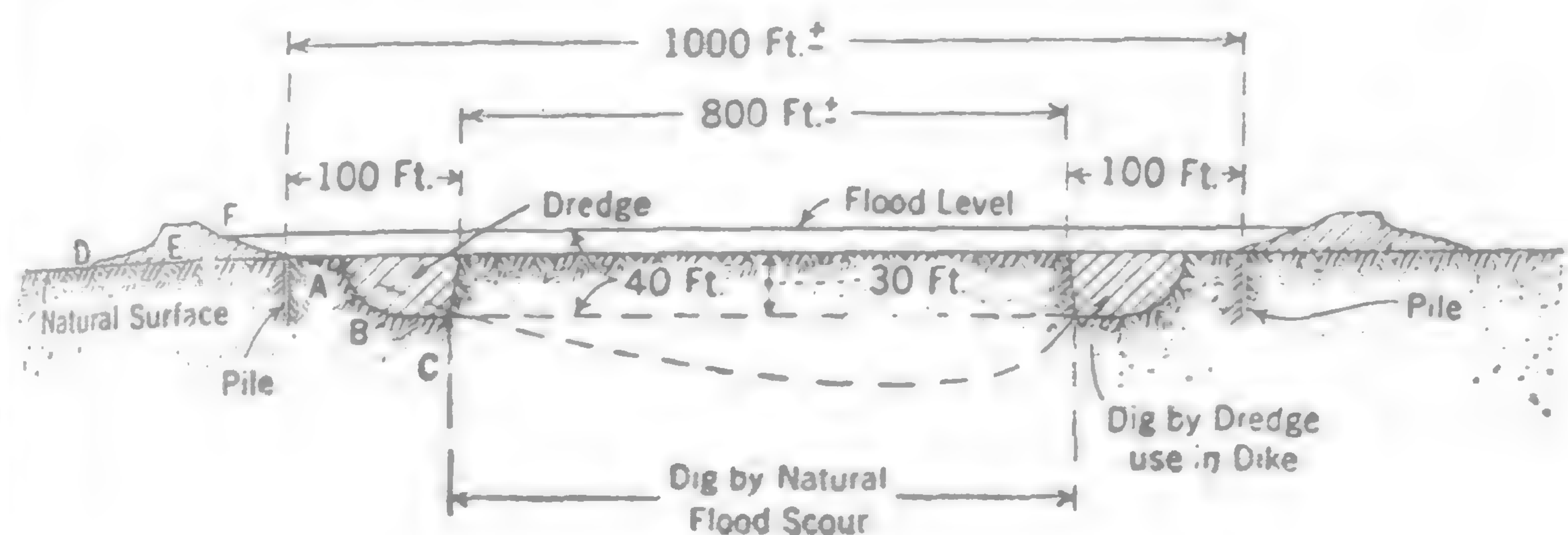


Figure 1

This Scheme for Using the Natural Flood Scour in Control of the Hwai River is also Proposed for the Yellow River

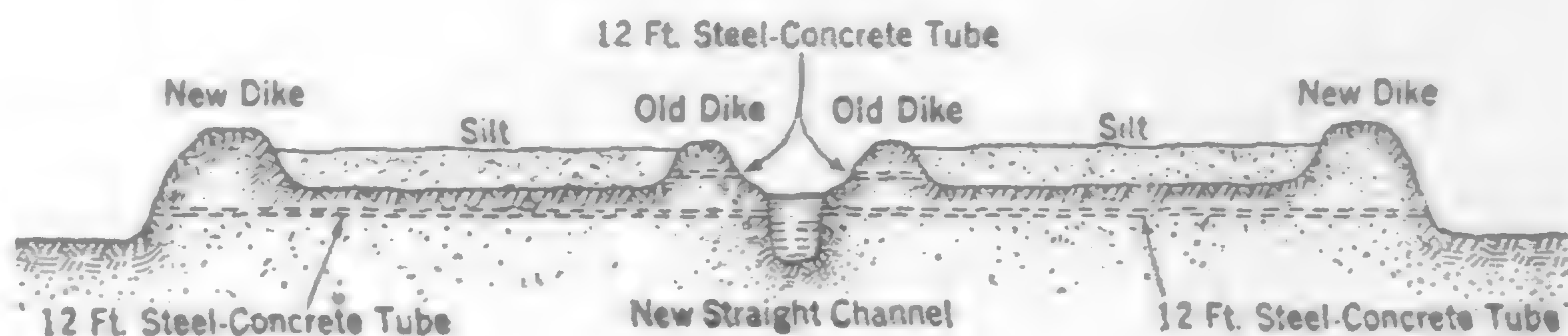
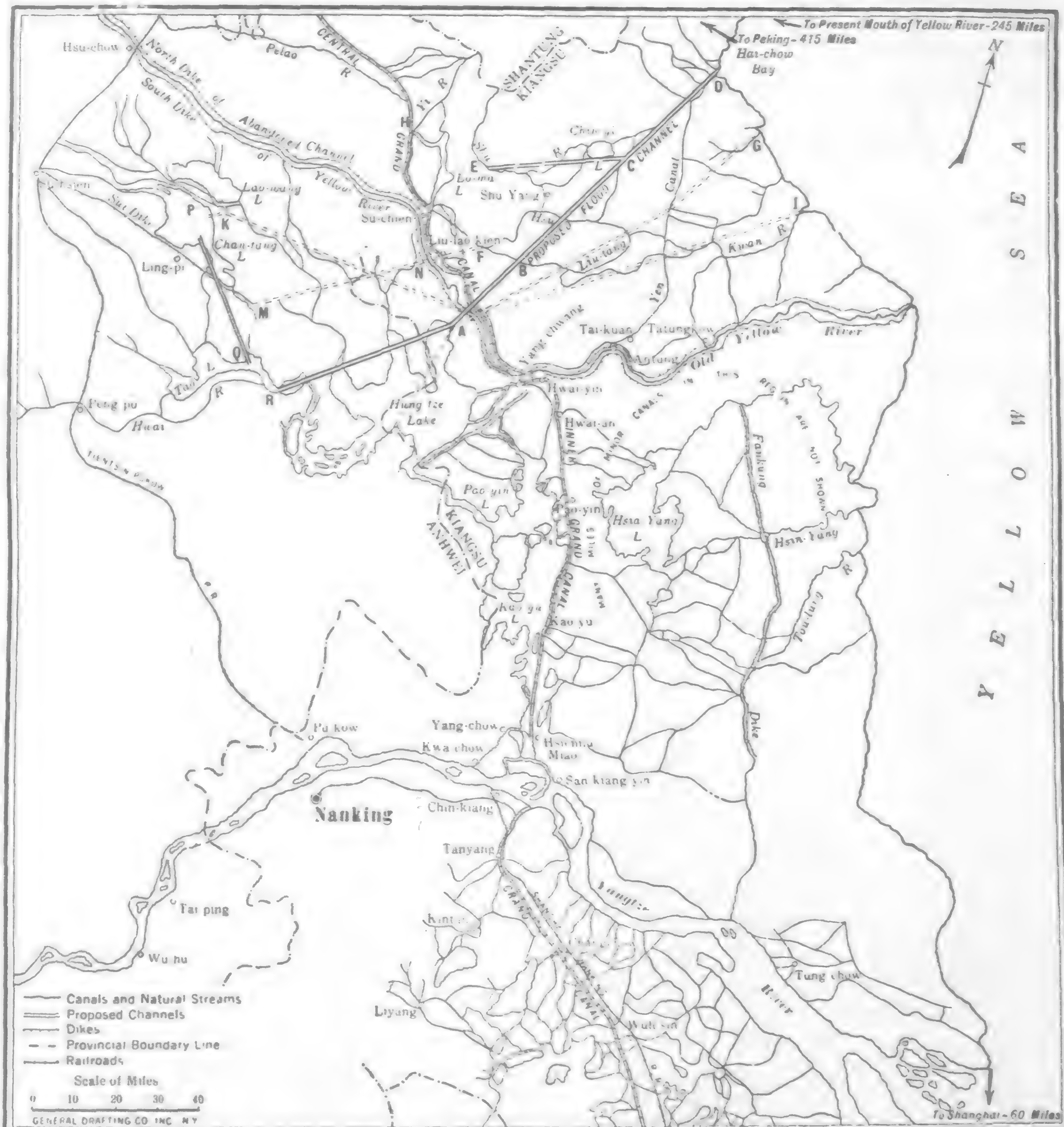


Figure 2

Sketch for a Reclamation Plan that Provides New Dikes to Protect the Yellow River Basin from Floods

toll of victims in the same manner as the present calamity in adjacent districts, and review the efforts of the American Red Cross Society to find a means to do away with future floods in this region, the work of Mr. C. D. Jamieson, the labors of Chang Chien's staff of Chinese engineers, the surveys of Colonel Seibert, and lastly, the investigations of the Siems-Carey Company. This, however, would lead to nothing. It is gratifying, however, to see that Mr. Freeman has tackled this problem with a vigor and viewpoint which must commend his work to the engineering community, as offering more of a permanent solution than any of the preceding schemes. The Freeman scheme contemplates making the Yellow River dig a permanent bed for itself; it includes, at the same time, the construction of a short-cut channel from the Hung-tze Lake district to the sea at Haichow. The lakes in that district now drain into the Grand Canal, which, as a result, frequently overflows its banks and devastates the surrounding country. The engineer has evolved the scheme of digging his new channel a distance of eighty-five miles. In connection with it would be reservoirs, and the water from these would irrigate extensive tracts where now, in a rainless season, the sun bakes the soil as hard as brick and kills all growing grain.

Along the Yellow River, if the Freeman proposal were adopted,



Freeman Plan for Preventing Flood and Famine in Shantung and Kiangsu

The Yellow River, by Digging its Own Deep Channel to the Sea, would be Converted from "China's Sorrow" into a Navigable Stream and Reclaim Millions of Acres of Waste Land

The Map and Plans on this page are reproduced from Asia.



Model of Japan's New Parliament House

Japan's New Parliament Building

IN keeping with her new importance as a great world power, Japan is busily engaged in transforming her quaint medieval capital into a modern city beautiful. The architectural monstrosities of a bygone age, foisted on the Japanese by foreign architects are giving place to more dignified and enduring structures. The use of concrete and steel has permitted the erection of imposing buildings in a land subject to earthquakes, which, in addition to frequent conflagrations, has limited the size of Japanese houses to one or two stories. A Greater Tokyo is being planned, in which steel and concrete will supersede the old wooden and stucco houses with thin black tiled roofs. Foremost amongst the many new public and private buildings will be the new parliament house, a magnificent pile of steel and concrete faced with cut granite which will arise from the highest ground in the centre of the capital near the imperial palace.

The final details for the construction of this building were completed in April, and work on the foundations is now progressing. The government architects will supervise much of the work,



Japan's New Parliament House: The Central Tower and Main Entrance

calling for tenders for special features only. This structure calls for the expenditure of Y.23,000,000 spread over a period of seven years.

Covering an area of 14,984 sq. yards, the building will be set in the middle of a park of 76,680 sq. yards, and will have a total floor area of 59,960 sq. yards. Exclusive of the basement there will be three stories, with a frontal of 1,128 feet and a width of 368 feet. The height from the ground to the roof will be 86 feet and 261 feet to the top of the central tower. There will be 361 rooms, with the area for the house of peers and the house of representatives about evenly divided, each calling for 840 square yards of office area. The house of peers will seat 500 members with provision for 580 and a gallery capacity of 968 seats. The house of representatives will also seat 500 with provision for 630 and have a gallery seating, 1,137 persons. The foundations will be built upon piles and concrete pedestals, while the structure will be of steel with brick walls faced with cut granite, with reinforced concrete floor-sand roof.

Electrical Opportunities in Indo-China

THE larger industrial establishments of Indo-China and many of the cities and towns are waking up to the necessity of electrifying their motive power, and have already installed or have under projection the erection of central stations, which in the main are turbo-alternating plants of 1,200 to 2,000 H.P. Five central stations of large capacity are already operating in Haiphong, Hanoi, Saigon

while the towns of Kompong Tjame and Angkor are sadly in need of light. In far distant Laos, small plants are operating in the two capitals, Vientiane and Luang Prabang, which are inadequate to meet the demand and are to be enlarged.

The electric tramways of Hanoi with their 27 kilometers of lines are insufficient to meet the needs of traffic and the natives are clamoring for extensions into the surrounding country in order



Tongking, Hanoi, Rue Paul Bert



Beautiful Roads in the Environs from Saigon

and Benthuy, while two additional plants are being installed at Hanoi for supplying power for irrigating pumps in that district. It is expected that several similar plants will follow these, while numerous projects are on the tapis for smaller isolated plants operated by gas or steam. Not only are such plants highly essential for lighting, but the climate calls for thousands of fans and current to operate small ice plants and minor industries in the numerous towns and villages.

In Tongking, central plants are now in operation in Hanoi, Haiphong, Hongay, Doson, Bac-Ninh and Laokay with one under construction at Namdinh and projects for Tuyen-Quang, Langson and other places. In Annam, plants are in operation at Vinh, Benthuy, and Hue, with projects for Tourane and Dalat. The towns of Quinhone, Faifoo, Quangngai and Thanhhoa also require plants. In Cochinchina, in addition to the 6,000 H.P. central station at Saigon, there are plants in operation in Mytho, Cantho, Sadec, Chaudoc and Longxuyen. Over one hundred smaller prosperous cities and towns await illumination. In Cambodia, two central stations are in operation in Pnom-Penh and Battambang

to escape the uncomfortable and high-priced system of auto-busses. These suburban lines call for an additional 70 kilometers in the Hanoi district alone. In addition, projects are being studied for tramways to connect Haiphong with Kien-An and Doson, a distance of 28 kilometers, and with Qunag-yen and Hongay, a distance of 82 kilometers.

In Annam, tramways are required to connect Vihn with Benthuy, 6 to 8 kilometers, Tourane with Faifoo, 24 kilometers, and Quinhone with Bihn-Dinh, 20 kilometers. Above all, Cochinchina requires adequate means of transport. Saigon is electrifying a scheme of 20 kilometers of tramways, but there is urgent need of at least 30 additional kilometers of urban and 50 kilometers of suburban lines. As to the rest of Cochinchina, 400 kilometers would not be sufficient for a prosperous people who desire to move around with comfort and willing to pay for it. As an instance of the volume of traffic in this province it is pointed out that between the two small towns of Cantho and Soctrang, separated by 60 kilometers of road, there is a daily service of 50 autos, which charge at least three times as much as would be necessary to enable a



Native Irrigation Methods, Indo-China. Numerous Schemes are Projected to Operate Irrigating Pumps by Electricity

tramway to pay dividends. In the town of Pnom-Penh in Cambodia thousands of farmers come and go to the market packed like sardines in old rickety autos or native carts.

Aside, however, from the great demand for electric power for lighting and tramways, irrigation requirements offer the most profitable returns from the installation of central plants. In



Cambodia Royal Palace, Pnom Penh

Cochin-Chine, plans are being studied to establish these electric irrigation systems along the canals and rivers in connection with tramways. One such installation is about to be carried out at Phung-Nhiap, while in Tongking and North Annam two schemes of electric pumping for irrigation will shortly be commenced. One of these schemes will irrigate 15,000 and the other 100,000 hectares.

In addition, there are many mines in Tongking requiring electrical plants. Some are already equipped, such as the Pia-Ouac tin and wolfram mines with 750 H.P. and the coal mines at Hongay, while plants aggregating 2,000 H.P. are being installed in the mines at Lang-Hit and Phan-Me.

The clamor of public opinion has moved the Indo-China railway authorities to equip their coaches with electric lighting and ventilators. In addition, electric tramways, funicular or aerial, are projected for the mountain stations of Tamdao, Popokvil, Dalat, Chapa, etc.

Hydro-electric plants are still rare in Indo-China notwithstanding the enormous amount of water-power existing in the country. This is due, however, to the great distance of the water power from the industrial centres and to the fact that in Saigon and Haiphong coal is both excellent and cheap. However, the Tintouc (Pin-Ouac) wolfram mines are installing a hydro-electric plant of 750 H.P. and another installation of 14,000 H.P. is projected in Tongking for



Elephants Kneeling before the Gate to the Royal Palace at Hue Annam

the manufacture of sulphate of ammonia and still another of 2,500 H.P. at Lang-Bian for the illumination and other requirements of the mountain station of Dalat. For a long time studies have been made for the erection of a 40,000 H.P. hydro-electric plant

near Saigon, utilizing the cataracts and rapids of the Donai River. One of the rapids of the Mekong at Khone has a minimum volume of 1,000 cubic meters of water per second with a head of 18 meters and will confer, when the day comes to exploit it, a great importance to that district.

Harbor Work at Chefoo Progresses Steadily

The breakwater for Chefoo harbor, in accordance with plans to make this North China port thoroughly modern in every respect, was completed by the end of 1920. Work on the mole went forward steadily, according to the engineer-in-chief of the Chefoo harbor improvement commission, Mr. C. Rickard, from March of last year.

The breakwater is approximately at its full height and protected by heavy rubble on the slopes for a length of about 3,200 feet. A total length of 17,000 feet of parapet wall has been built. Work on the mole to December involved the depositing of 194,000 cubic yards of sand, 167,000 square yards of brush wood zinkstucks, and 64,500 tons of rubble in the foundations and lower part and nearly 173,000 tons of rubble in the upper part.

The reinforced concrete caisson for east end of the quay was sunk successfully during the summer: it has been filled with concrete and the large masonry blocks in the quay wall and the wing walls have been put in place. About one-half of the masonry superstructure remains to be constructed.

Expenditure on work for the year amount to Chefoo Taels 645,942. This port work promises to restore to Chefoo something of its old importance as an outlet for Shantung. It is the only harbor not controlled by Japan. Its chief difficulty is the lack of railway communication with the interior. The Chinese gentry are still attempting to finance the Weihsien railroad to be independent of Japanese-controlled lines in a large part and greatly increase China's economic hold on Shantung, backed by the Peking government.

Wallace Cured Sick Steel

An incident is related of Henry C. Wallace, the new American secretary of agriculture, which identifies him with the iron and steel business in an interesting way.

Several years ago the readers of the farm publication of which he is editor made complaint of rapidly rusting fence wire. Henry C. Wallace put their problem up to the agriculture department, the same as he would have done in case an inquiry had come regarding a mysterious disease among livestock. Instead of a sick hog, it was a case of sick steel.

The readers wanted to know why the wire fences they put up did not last like the old-fashioned wire fences their fathers had put up before them. Rust seemed to be playing havoc. The government metallurgists at Washington asked for specimens of old fence wire which has resisted corrosion, along with samples of the new fence wire which had rusted so rapidly, for the purpose of comparison and analysis.

It was found that modern rapid practice in steel making had left the metal full of impurities, as compared with the old-fashioned hand-made iron, and that the presence of these impurities caused the rapid corrosion of the new fence wire.

The department of agriculture made a notable contribution to the science of metallurgy in this discovery of the reason why steel and iron rust, and it is a matter of interest that Henry C. Wallace, who sent the first samples of rusted fence wire to Washington and thereby opened up this important investigation, is to-day heading the department.

The Mines and Minerals of Yunnan

South China

By J. COGGIN BROWN, O.B.E., D.Sc., M. Inst. M.M., F.G.S.

Geological Survey of India

The author gives a description of the mineral resources of Yunnan, the most south-westerly of the Chinese Provinces, adjoining Burma and Tongking

From the Mining Magazine

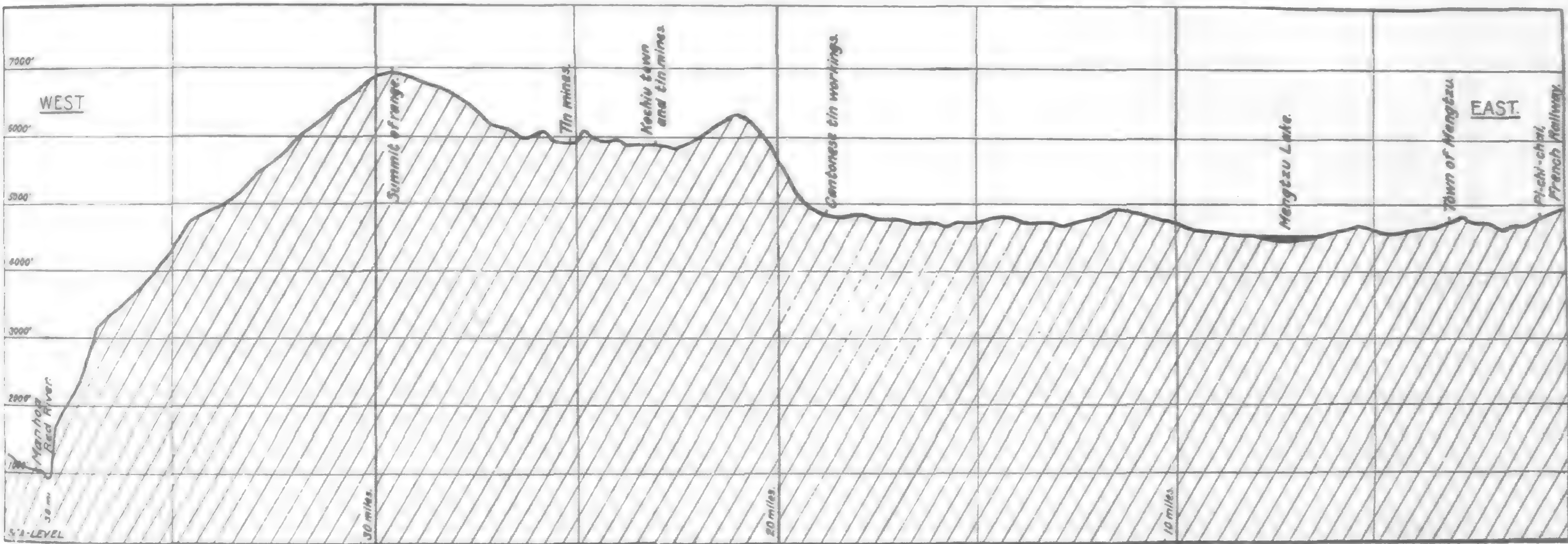
Concluded

FUTURE OF GOLD MINING.—Regarding the future possibilities of alluvial or lode-gold mining in Yunnan or about its borders, all that can be said is that deposits exist which deserve careful testing. The Yangtze, Mekong, Salween, Shweli, and their tributaries all carry gold. In this way they do not differ from the Irrawaddy and its branches, which may be regarded as members of the same group of rivers, as far as their upper reaches go. The Irrawaddy is the only one of the group in which long and careful tests have been made. There gold dredges worked for years on this river above Myitkyina, and in 1918 ceased operations, which

The following assays illustrate the similarity in composition of these brown coals :

Locality.	Mois- ture.	Volatile Matter.	Fixed Carbon.	Ash.	Remarks.
Nan Tien, Wes- tern Yunnan ...	% 15.86	% 34.00	% 20.33	% 29.81	Mean of 2 assays
Eastern Yunnan...	19.94	34.39	27.72	17.95	„ „ 7 „
North Shan States	16.55	36.62	35.11	11.72	„ „ 18 „

TRUE COALS.—The earlier French writers established the existence of coal seams of triassic and middle carboniferous age.



Section from Pichichai Through Tin District to Manhoa

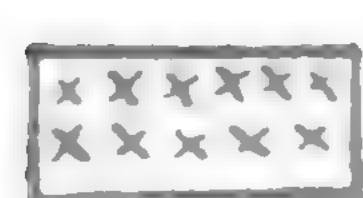
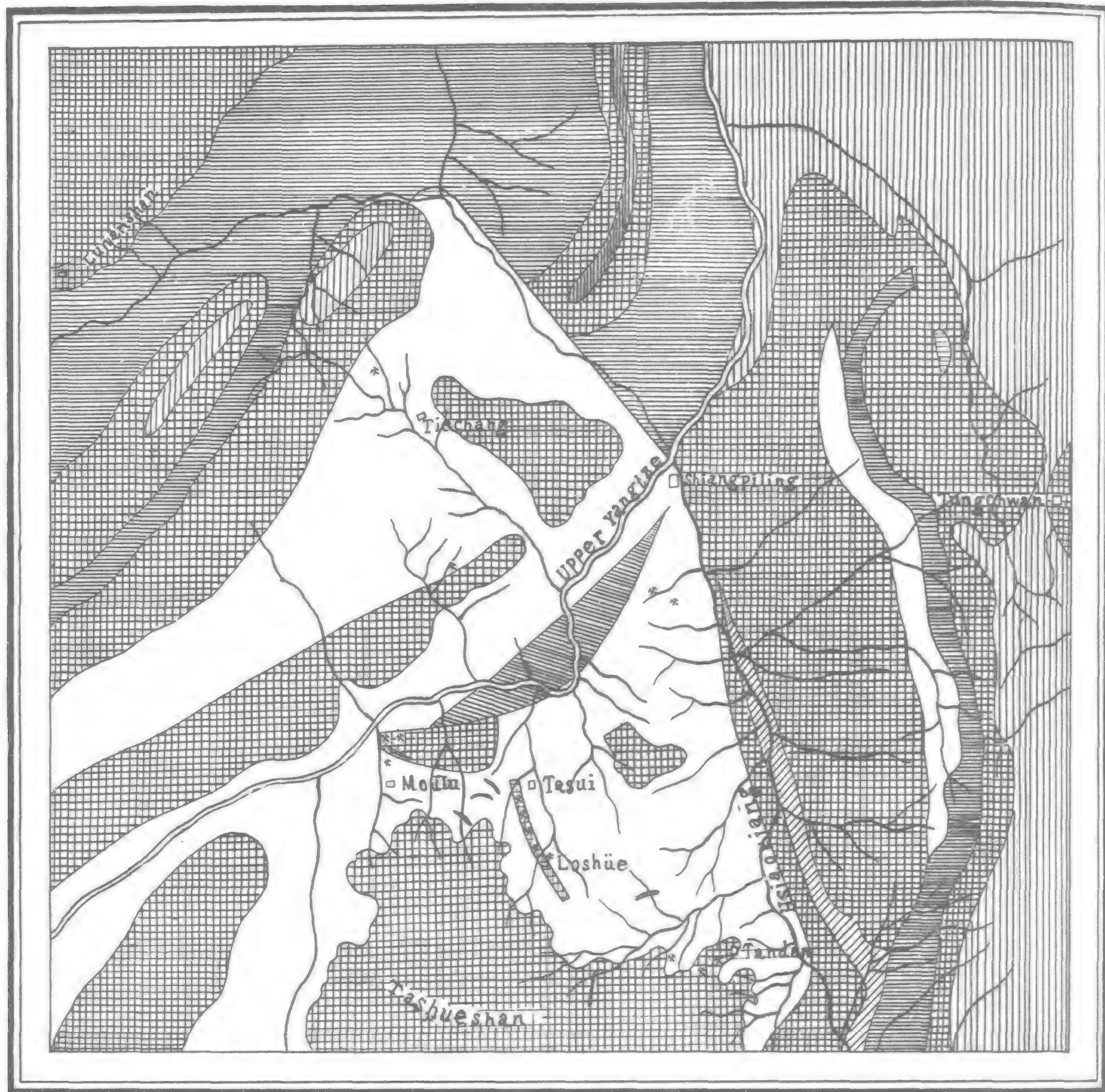
apparently could not be carried on profitably. Whether the alluvial deposits of the other rivers are richer or not is unknown. The Chinese are the most frugal race in the world and too many earlier writers have been led to dream of El Dorados, because they have been a group of men eking out a miserable existence on lean gold deposits which no one else would touch. However, richer deposits may occur, but they will have to be sought for and investigated.

The most promising region for the occurrence of lode gold appears to me to be in the basins of the Yalung and its tributary the Litang in Ssuch'uan.

LIGNITE.—Lake basins filled with lacustrine and fluvio-lacustrine deposits of late pliocene and recent ages abound throughout Yunnan. To these deposits I have given the name "Nan Tien Series." Bands of lignite often occur in them and are sometimes mined for local purposes. The lignites are similar in composition and origin to those which occur in the basins filled with Tertiary silts in various parts of the northern Shan states of Burma. One of these Shan coalfields is now being opened up by the Burma Corporation. I have not seen any seams in Yunnan which approach the Shan ones in thickness or regularity.

The former occur mainly in the south-east of the province, and are of upper and lower triassic age respectively, though there is one important field in Central Yunnan which probably stretches from the vicinity of Yunnan Hsien northward into the Yangtze valley. In both regions it is mined and burnt by the local inhabitants. The Triassic coal of the Yangtze valley is of excellent quality ; low in ash and moisture, it has a high calorific value, burns with a brilliant flame, and yields a coke of very good appearance. I have examined also most of the important coal-bearing localities of the middle carboniferous in eastern Yunnan. They yield a semi-bituminous coal which cokes well, and the best seams are probably preferable for steam-raising purposes to the triassic coals.

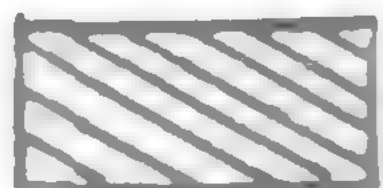
Yunnan coal has a future before it in the local market for metallurgical operations, domestic purposes, industrial uses, and as a fuel for the railways. I do not think that it will ever obtain a large market beyond the frontiers, owing to the land-locked position of the province, forming as it does the western hinterland of continental China, and also to the hold which Japanese, Indian, Australian and African coals have in the markets of the Far East in normal times.



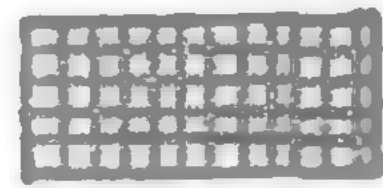
Gabbro



Basalt



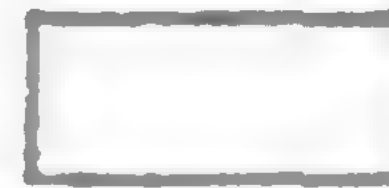
Permean



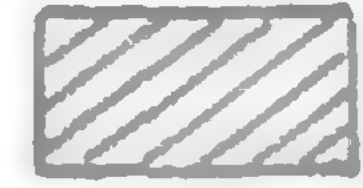
Permo-Carboniferous limestone



Middle and Power Carboniferous

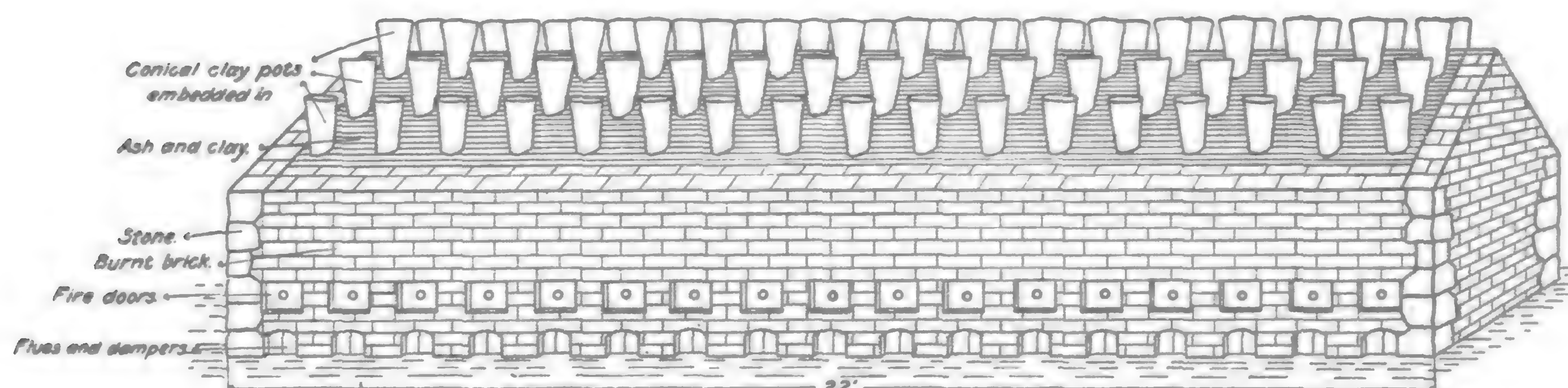


Metamorphosed Palaeozoic beds



Cambrian

SPELTER FURNACE AT O-YIN-SHAN, YUNNAN.

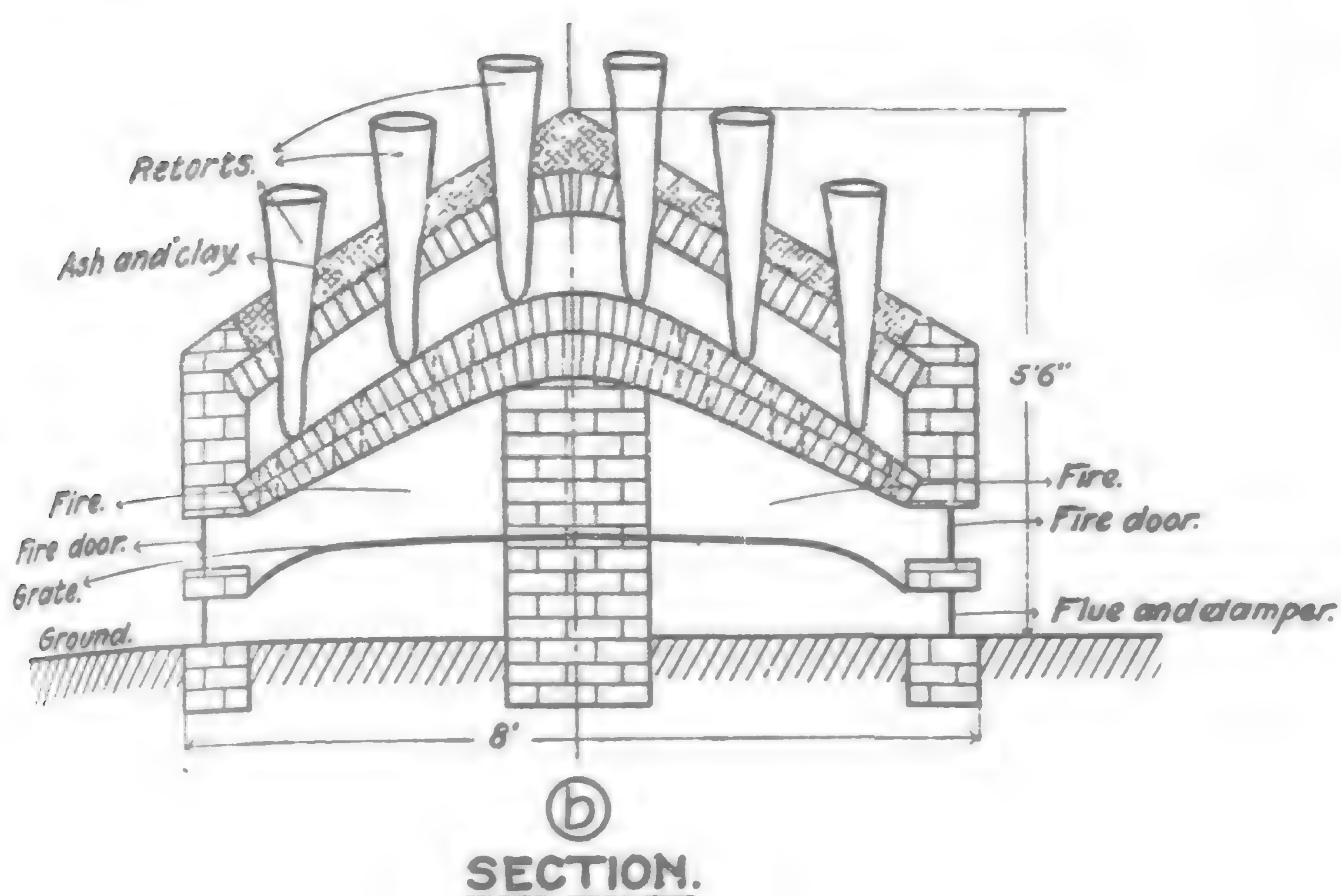


(a)

GENERAL VIEW.

IRON.—Iron ores are well distributed throughout Yunnan, and while none of the deposits appear to be extensive, or in any way comparable with, say, those of the crystalline rocks of the Indian Peninsula, yet iron-smelting is a settled industry, and all the large centres of population have their somewhat small needs

of cast iron, wrought iron, and steel supplied from works in the same regions. Again, where any unusual demand has arisen, as in the case of cast-iron pans for the brine-boiling on the salt fields, there is generally an ironstone mine, blast-furnace, and foundry not far away. Yungch'ang Fu has its mines at P'ingtai in the



Tatienpa valley, two stages to the east of the city. Tengyüeh is supplied from the Tient'aungkuan, a district which lies to the north. Yunnan Fu, the capital, has its requirements met from the Yimen Hsien area; the cities of the south-east from the Hsio Hsien neighborhood, and so on.

The hemispherical cast-iron pans of Yunnan are much appreciated by the Chinese everywhere, and may be found in all the bazaars of Upper Burma; while the thousands of mules engaged in carrying the trans-frontier trade are always shod with Yunnan-made shoes and nails, and every caravan carries a large stock of these excellent articles.

From Têngyüeh to Yingpankai, the centre of the iron industry of Tient'aungkuan, is a three days' journey. The stages are at Machankai, 14 miles; Kutungkai, 23 miles; and Yingpankai, 34 miles. The mines are situated at the head of a small valley about four miles from the village, which has an elevation of 6,000-ft. above sea-level. A fine-grained granite crops out in the vicinity, but geological observations were made difficult by a thick soil cap. There were a number of workings descending into a large mass of brown hematite. I traced the outcrop on the surface for 60-ft. without seeing its limits. It strikes a few degrees east of north and is from 10- to 15-ft. wide. The ore was carried down to Yingpankai, where there were three furnaces, or to Malipa, three miles further north, where there were five. The furnace was of massive stone work, the back and sides forming a rough semi-circle. It was lined with a refractory white clay. It differed essentially from the high blast-furnaces used for smelting iron ores in other parts of Yunnan, as it was only 7- or 8-ft. high at the back. The blast was let in by a tuyere which entered the lower portion of the back wall. The blower, 7- or 8-ft. long and 1½ ft. in diameter, was worked by a water turbine. The tapping hole was also used as the slag outlet until the hearth filled with molten metal. In front of the furnace a stone-paved incline sloped down to a tank filled with water, used for quenching the hot material at the end of the blow. Three rectangular holes in the upper part served as places where long iron rods could be introduced to prevent clogging. Charcoal and ore were added from time to time during the 24 hours which the smelting operation took. Two grades of material were produced, the first in the form of flat cakes of pig iron, and the second made up of the finely-divided iron mixed with a good deal of charcoal. The latter was worked up in forges into horse-shoes, nails, ploughshares, etc. The cakes of pig iron were used to make cast-iron pans. The furnace used for melting the metal was a small, round-bottomed, tilting blast-furnace about 4- or 5-ft. high, made of thick clay work, and strongly bound with iron bands. The molten metal was tapped into a ladle, and then poured into the moulds. The iron pans produced in this way were of beautiful workmanship and varied in diameter from 10 to 30 inches.

Iron is smelted from ores obtained at several places in the vicinity of Shach'iao, a small village four miles to the north-west of Chennan Chou. At Yecho Ho I examined a blast-furnace 25-

ft. high, and 6- or 7-ft. across at its widest portion, narrowing to 3-ft. at the hearth and top. It was built of heavy stonework enclosed in beams held together by cross-pieces, and was lined with clay. The tuyere was cut from a block of hard sandstone. The blast was produced by the usual cylindrical blower worked by a turbine, on the principle of the vertical axled water wheels commonly used in the Himalaya for the supply of power to corn mills. The ores of this region are rather soft hematites derived from ferruginous horizons in the red beds series.

The P'ingtai mines and smelters lie two stages to the east of Yungch'ang Fu. The ores are obtained from horizons in the Palæozoic limestones of the vicinity, and are treated in high blast-furnaces of an untapering type. The cast iron is worked up into bars of wrought iron for general smithy purposes, and there is also a foundry for casting iron pans.

In the Yuanmou Hsien district, I heard of a mine at Yich'ang, five miles from Lungkai, a village on the main road between Makai and Manshan.

There is an iron-stone mine at Laopeya, one stage from Têngch'uan Chou. Cast iron is made on the spot and turned into pans for use in the brine-boiling centres around Yunlung Chou.

Huili Chou is supplied with iron from Ilang Ho, two stages west of the city, and also from a mine and smelter at Laopingwan.

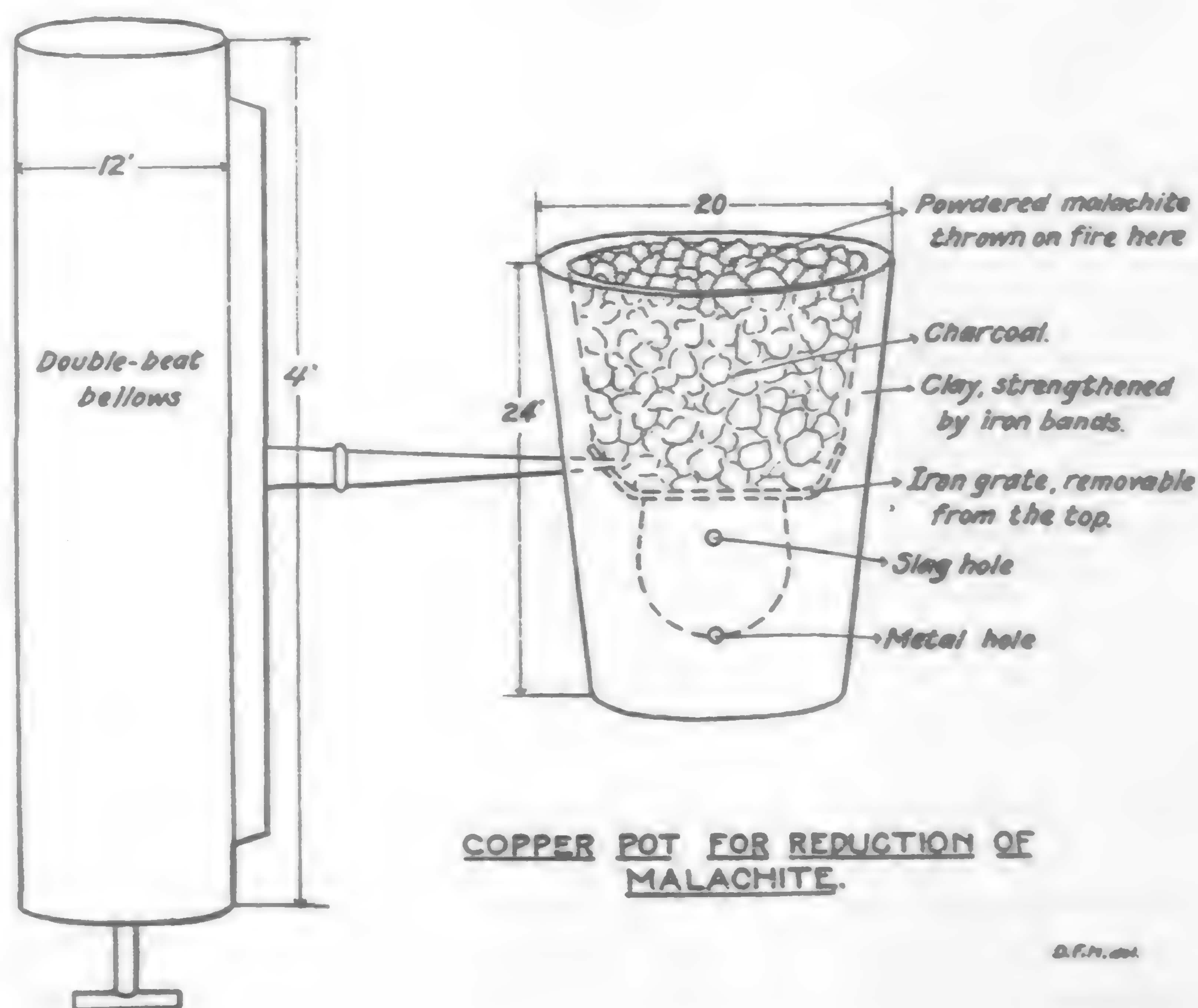
Near T'iehch'ang, a village four or five miles to the north-east of Yungp'ing Hsien, I found old iron slag heaps, but could obtain no information as to when they were made.

Iron ores are mined and cast-iron pans made at Lutzu, two stages north-east of Lufêng Hsien. These pans are used in the salt-fields around Lanching.

Hematite ores occur in bands in the Kaoliang slates between Mosoying and Yimen Hsien, and it is said that there is a large mine at Yanghsingch'uan, a village on this route.

If Chinese evidence may be relied upon, one of the more important iron-producing regions of Yunnan is located around Hsi-shankai, which lies one stage north-west of Tatsangkai, a large village near the head of the Mênghua T'ing valley, and about half-way between that city and Tali Fu. I was informed that the mines work all the year round, that they find employment for between 300 and 400 men, and that they supply the cities of Mênghua T'ing, Tali Fu, and Lichiang Fu with the metal.

There are no iron ore deposits in Yunnan that I am aware of at all comparable in extent with those of the old crystalline rocks of India or Indo-China, and as the local demand is a small one, and not likely to increase very greatly, a large iron business would have to depend for its success on trans-frontier trade. The geographical position of Yunnan would make freight charges so



high that even with railway transport available in all directions of outlet the local products would find it next to impossible to compete with French, Chinese, Japanese and Indian manufactures in the Far East, and perhaps with European and American products landed on the coasts there. That a modern blast-furnace plant can be successfully operated in China is, of course, perfectly well known, but a situation such as the Hankow works enjoy does not exist in Yunnan. At the same time there is very considerable room for improvement in the local industry, but I am persuaded that this is a matter which may well be left to the small Chinese capitalist. Future progress in the way of systematic mining, more profitable utilization of the ores, and the closer association of the smelters with the coalfields of the province, if they come at all, will probably come through him.

SALT.—The salt-producing beds of Yunnan occur toward the base of the red beds series of permo-triassic age. This series covers a great expanse of country, and the chief salt-manufacturing centres are situated in places where the lower horizons have been favorably exposed. The following prefectures all contain districts from which salt is obtained, and are arranged in order of relative importance :—

(1) Chuhs'uing Fu.—Production 22,100 tons per annum from the districts of Tingyuan Hsien, Yaochou, and Kuangtung Hsien; supplies the areas around the capital and towns as far south as K'aihua Fu and Mêngtzu Hsien, with an estimated population of five and a half millions.

(2) Puerh Fu.—Production 6,500 tons per annum from the districts of Chenyuan T'ing, Wei-yuan T'ing and Puerh Fu itself; supplies the south and south-western part of the province, both Chinese and aboriginal, estimated at one million six hundred thousand.

(3) Tali Fu.—Production 3,600 tons per annum from the district of Yunlung Chou; supplies the towns of the Tali Fu, Yungch'ang Fu and Shunning Fu prefectures, estimated at nine hundred thousand.

(4) Lichiang Fu.—Production 1,400 tons per annum from the district of Hoch'ing Chou; supplies the north-western corner of the province, estimated at three hundred and seventy-five thousand.

(5) Ch'engchiang Fu.—Production 1,300 tons per annum, from the district of Chingtung T'ing; supplies the surrounding country, estimated population three hundred and fifty thousand.

(6) Yunnan Fu.—Production 600 tons per annum, from the district of Anning Chou; supplies certain areas to the south, including Chiangch'uan Hsien and Hsinhsing Chou, which have an estimated population of one hundred and fifty thousand.

(7) Ch'uching Fu.—Production 400 tons per annum, from the Wut'ing Chou district; supplies the country around this town, with an estimated population of one hundred thousand.

This grouping follows more or less approximately the one adopted by the provincial salt administration. A broader classification based on geological and geographical grounds is the following :—

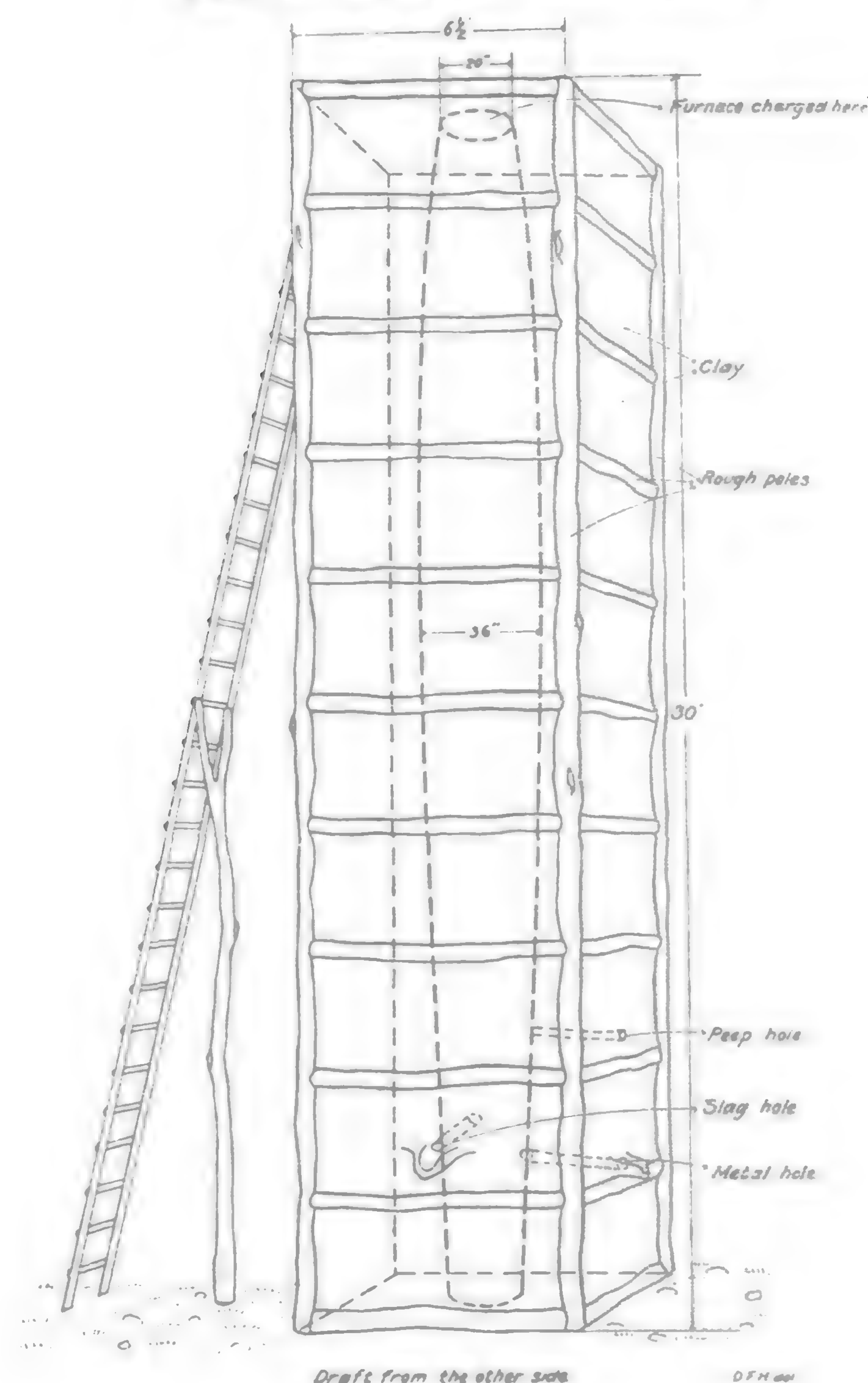
(1) The salt fields of north-western Yunnan, including those of the Tali Fu and Lichiang Fu prefectures.

(2) The salt fields of Central Yunnan, including those of the Chuhs'uing Fu, Yunnan Fu and Ch'uching Fu prefectures.

(3) The salt fields of south-western Yunnan, including those of the Puerh Fu and Chengchiang Fu prefectures. The fields of the Chingtung district are about midway between those of Wei-yuan T'ing and Tingyuan Hsien, but they are really an isolated portion of the south-western field.

It will be noted that all the salt-producing districts are east of the Mekong River. The total retail value of the 36,000 short tons of salt produced per annum in Yunnan I calculate to be about £288,000, and the total annual revenue derived by the government at the time of my travels in the country about £170,500. It will be observed that the 36,000 tons of salt is consumed by a population of 9 millions, but it has been stated already that the population of Yunnan is about 11 millions. The question may

BLAST FURNACE FOR IRON, TONGHAI, YUNNAN.



be asked, where do the remaining 2 millions obtain their salt supplies from? In this connection it may be mentioned that the north-eastern districts are supplied from Ssu-ch'uan, that there are brine wells at Yakalo, a town five miles outside the Yunnan border in the extreme north-western corner of the province, and that there is a certain amount of illicit manufacture and contraband trade in salt in other regions. Salt is also made from brine at Yen-ching and Yentang in the Yenyuan Hsien district of Ssu-ch'uan. These places are within short distances of the northern border of Yunnan in the Yungpei T'ing district.

SALT IN THE TINGYUAN HSIEN DISTRICT.—The salt-producing localities in this district are Lanching, Heiching and Houching. At the former the salt is made entirely from the brine of five underground wells. A steep incline is driven down into the salt-bearing strata, terminating at the bottom in a well 60- or 80-ft. deep with a diameter of 5- or 6-ft. The salt is dissolved out by the water in the rocks, and, percolating into the well, is raised in a carrier of untanned buffalo skin worked on a primitive windlass, manipulated by four men. On reaching the top the liquid is emptied into a small tank excavated out of the rock. From here it is pumped to the surface as required. The pumps are made of hollow bamboos, from 4- to 6-in. in diameter, and from 8- to 10-ft. long, fitted with a piston made from a stick with a T-piece handle, to the other end of which a loosely-fitting plunger of skin packed with straw is attached. This is inserted inside the bamboo, which is open at both ends, and has one end dipping into the brine tank. A man sitting astride fills the bamboo with brine by means of a hand baler and then quickly works the handle up and down; the brine is sucked up and flows out at the upper open end into a small pool built at the side of the incline. From this pool another pump of the same kind lifts it a little higher, and the operation is repeated until the surface is reached. The brine now flows by gravitation in open wooden boxes to the storage tanks, which are generally sunk in the ground near the evaporating sheds. It is ladled out as required and carried in wooden pails to the sheds. These usually contain four furnaces, each fitted with 20 or 30 hemispherical iron pans varying from 2- to 4-ft. in diameter. They are supported on iron bars covered with brickwork. The entire top of the furnace is filled in with brickwork up to the level of the tops of the pans.

The brine is systematically treated; going first into a large central pan, it is heated, and then filtered, while hot, through cloth into a second pan. As it becomes more concentrated, it is transferred again and again, until solid cakes of salt are formed. When the furnace, which is heated with brushwood, is cool, the salt is taken from the pans, cleaned and weighed. At intervals of a month or so the brick and clay work of the furnace is replaced, the old material broken up and leached with water to extract the salt which it contains.

Heiching is about four miles to the north-east of Lanching and the small town is built around its eight brine wells. Most of these are underground, similar to those in Lanching, though there are others which are open to the surface. The brine is won and treated by methods identical with those just described. Houching is 12 miles to the south-east of Heiching, and it possesses several brine wells of the same type, and in addition three mines from which rock salt is won. The salt occurs in patches and strings in a hard red sandstone of considerable but unknown thickness, only about 20-ft. of it being mined. The sandstone is attacked in a methodical manner by driving large galleries into it, only sufficiently large pillars being left to support the roof. The rock containing the salt is smashed up and then leached with water, the brine being boiled down in the usual way. Some of the furnaces in Houching are much larger than those in the other places, and are built to take over 40 small pans. The salt from all the localities is taken to the government stores after being cleaned and weighed. It is there officially stamped with red paint, which, covering practically the whole surface of the mass, would show at once any attempt at pilfering by breaking off small pieces.

SALT IN THE YUNLUNG CHOU DISTRICT.—All the salt which this district produces is made from well brine. There are no salt mines. The wells are located as follows: Paofungching, in the city itself; Shihmenching, Tienerhching, Taching and Shangching, in a valley six miles north of the town; Lotenching, Luching and Shwuntanching in the unsurveyed area to the north of Yunlung Chou. At some of these places the brine is not evaporated to complete dryness, but the salt is removed from the pan while it is still wet, and firmly pressed into small cylindrical moulds, so that instead of the large masses made on other fields, which form a heavy load for a man, the salt comes on the market in the shape of small cylinders, each of about 3-lb. in weight.

SALT IN THE WEIYUAN TING DISTRICT.—The geology of this salt field is much the same as the others, the mineral coming from a low horizon of the red beds series. At Hsianggyenching there are two salt mines and two underground brine wells of the usual type with bamboo pumps. The boiling-down process is identical with that of the other fields. If anything, conditions are dirtier and more insanitary than elsewhere. The furnace houses are the homes of large families, and the gutters carrying the brine run along the village streets alongside the sewers. Hotitang has two salt mines which were opened about 1899. There are several other salt mines and brine wells in this region, but I did not succeed in obtaining a list of them.

SALT IN THE PUERH FU DISTRICT.—There are several salt-producing centres in this district, but I only visited one at Mohei. It is probably the largest in this part of Yunnan. Rock salt is mined and brine is obtained from wells. There are 28 evaporating sheds, and each furnace carries 24 pans in 6 rows of 4 each. About 300 miners and coolies are employed.

THE BRINE WELLS OF ANNING CHOU.—This place is a small town one day to the west of the capital. Around it there is a considerable development of massive red sandstones and other rocks similar to those of the more important saliferous localities. The brine is very weak, and before being boiled down is concentrated in the following manner:—It is led away in long open channels to shallow pools which expose as much of the liquid as possible and so favor evaporation. Beds of dried earth are arranged near these pools, and are periodically drenched with the salt liquors, which are baled out and thrown over them. Aided by the sun and the wind, the water evaporates, and the operation is repeated

until the earth will take up no more salt. It is then leached with water in tanks, and the dirty solution so obtained is filtered through beds of charcoal, ashes and sand, yielding a clear brine of much greater density than the original fluid from the wells. This is boiled down in the usual manner.

FUTURE OF SALT MANUFACTURE.—One of the most serious expenses of the industry is the cost of transportation from the manufacturing centres to the area of distribution, which is at present carried on by coolies or pack mules. The introduction of railways into the province will considerably reduce this. The output of salt in Yunnan appears to be slowly declining, a state of affairs readily understood when it is remembered that there are no workings which reach the deeper-seated deposits, and that the shallow wells have been worked so actively and continuously by the Chinese as to be now in a condition verging on exhaustion. Everywhere in the province the same story is told, a story of the former prosperity and the present depression of the salt-producing centres. The output could be greatly increased by the introduction of simple machinery, especially for pumping and quick transmission of the brine. I also believe that drilling would probably reveal the existence of salt-bearing horizons of the Upper Permian in places at present unknown to the Chinese, where they are lying buried under considerable thicknesses of later Mesozoic strata. Salt is everywhere under the strictest official control and is taxed at every stage, in its manufacture, purchase, at the vats, transport, sale at the depôt and sale to the people. The importation of salt from Burma into Yunnan is prohibited by the Burma-China Convention of 1894-1897.

MERCURY.—Cinnabar probably occurs in Yunnan; several specimens were shown to me at various places, though some of them may have come from the well-known mines in the neighboring province of Kueichou. At Yunlung Chou I heard of a cinnabar mine three or four days' journey away to the north, but I was not able to prove the accuracy of the information. According to Rocher, several cinnabar deposits were worked in the Tali Fu prefecture before the rebellion. He describes the roasting of the ores and the method adopted to condense the mercury vapors.

ANTIMONY.—Stibnite occurs in the Kaihua prefecture and also about Kwangnan Fu on the borders of Kwangsi. From time to time a few hundreds of tons of antimony regulus are exported from these places through the Mêngtzu customs.

MARBLE.—Tali Fu marble is famous throughout China and is used for decorative purposes. The quarries are on the high mountain wall a few miles to the north-north-west of the city. A crystalline marble crops out in them. It is a fine-grained variety with irregular lines and spots of dark micas and amphiboles in a white background, which produce fantastic effects and are much appreciated by the cultured Chinese. Large quantities of the stone are still available, but the industry is controlled by the dealers rather than by the quarry owners or polishers. The stone is prepared locally, and is often stained artificially and then covered with a coating of wax to hide the deception and emphasize the color design.

SEMI-PRECIOUS STONES.—The jadeite which is worked up in Têngyüeh comes entirely from the mines of the Mogaung subdivision of the Myitkyina district in Burma. The best qualities are said to be exported direct in the rough to Canton and only the second-grade stone is sent to Yunnan. Nevertheless, jade-cutting and polishing is a staple trade in Têngyüeh where every street has a lapidary's shop and lathe. Dealing in this mineral is very speculative, as the valuable apple green shades are often not visible on the outside of the boulders.

Amber ornaments are common. Most of the specimens I have examined bore the characteristic fluorescence of the Burmese material.

Turquoise ornaments are always worn by the Yunnanese Tibetans, but the stone is not of local origin.

CONCLUSION.—Longer accounts of the mineral deposits described in this paper may be obtained from Vol. XLVII, Pt. I, "Memoirs of the Geological Survey of India."

THE ELECTRIC SHIP

Japan Places Order with the New York Shipbuilding Company for a 20,000-ton Naval Service Ship to be Equipped with American Electric Propulsion Machinery

THE first naval contract placed in many years by the imperial Japanese government with an American shipyard was signed in the New York offices of the New York Shipbuilding Corporation, 120 Broadway, on May 18th by Captain M. Yokura, I.J.N., chair-

man of the imperial Japanese naval commission visiting the United States, on behalf of Captain K. Goto, chief of the imperial Japanese naval inspectors' office, 1 Madison Avenue.

It calls for the construction of a unique type of vessel, a combination coal and oil supply ship of 20,000 tons for fueling the various units of the Japanese navy.

The design of the vessels which has been worked out by the New York Shipbuilding Corporation in accordance with the outlined requirements laid down by the imperial Japanese naval commission, calls for a length on the waterline of 496 feet, with a beam of sixty-seven feet. The vessel will be electrically driven, the equipment being of the newest design furnished by the General Electric Company, and will have twin screws with a total of 7,500 horsepower, which will give the ship loaded a speed of fifteen knots per hour.

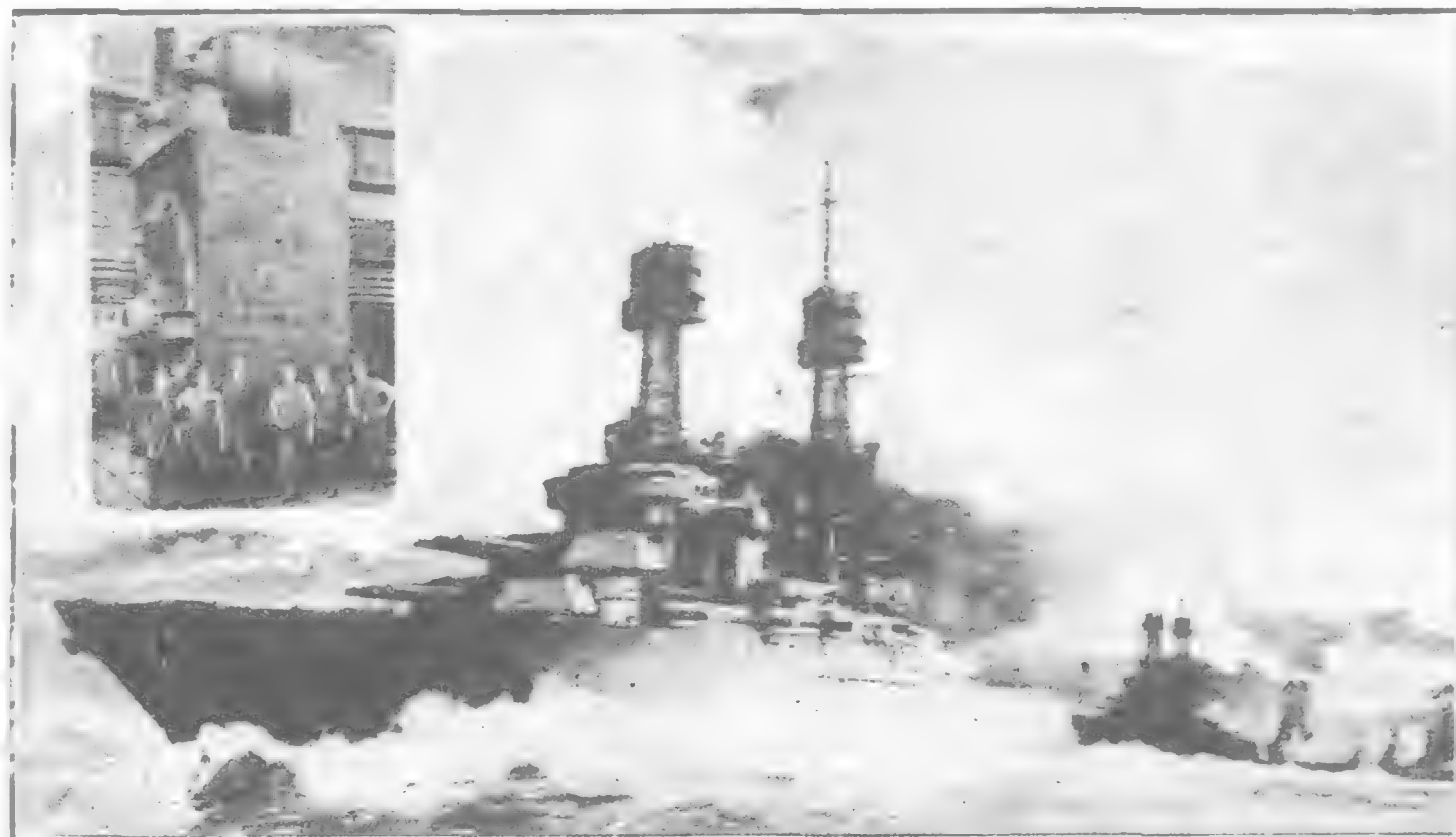
The vessel will be constructed with both oil and coal bunkers, while a feature of the new craft will be the installation of an anti-torpedo boat battery.

Although the plans for this special naval vessel will not be made public, the main feature, or the electrical propulsion equipment, will conform to the most up-to-date practice in this new field of marine engineering as developed by manufacturers of American electrical machinery. Japan will get for its navy the first electrically-driven ship outside the American navy, and in going to the United States to place the order, has demonstrated anew her intense good-will at a time when powerful forces are working to bring about a rupture in the traditional friendship between the two nations.

Great strides have been made in the past few years in developing this new field of electrical engineering, in which the Westinghouse Electric & Manufacturing Co., and the General Electric Company have taken the lead. The latter company has already built geared turbine machinery for 366 ships aggregating over 2,000,000 horsepower.

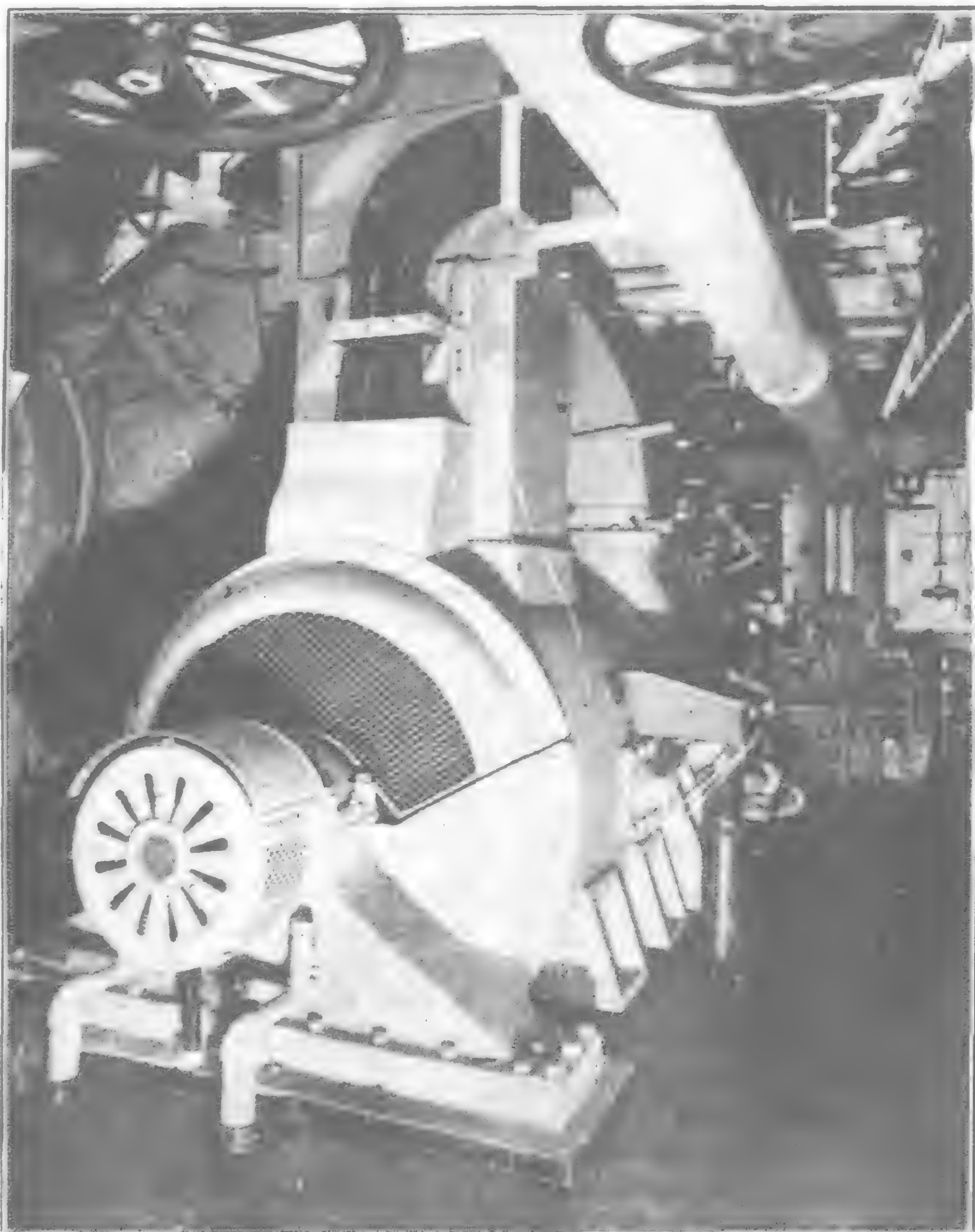
The company has carried on extensive experimentation with turbines, gears and electrical apparatus for ships. These studies have clearly shown that if the conditions of reversing and turbine applications are correctly allowed for, the electric drive gives a transmission efficiency practically equal to that of gears in the best condition; that it affords simple rotation and freedom from mechanical hazards; that it greatly simplifies the turbine and avoids in it dangerous temperature effects; that it affords space saving in most ships and in many cases eliminates long lines of shafting and shaft alleys; and that it is easily repaired without the use of machine shops and affords the most dependable kind of machinery which has ever been used to drive vessels.

On a par with the advances made by the General Electric Company are these made by the Westinghouse Electric & Manufacturing Company, which has also specialized on electric propulsion machinery for the American navy and mercantile marine. Contracts were recently awarded this company for the full propelling equipment of the two most powerful battle cruisers yet designed for the American navy, the "Constellation" and the "Ranger." These vessels will have a capacity of 180,000 horsepower each, and will be equally useful for scout work or taking position in the main battle line. The company has also received contracts for the propelling equipment of four great battleships: the *Tennessee*, *South Dakota*, *Montana* and *North Carolina*, and for two smaller battleships, the *Colorado* and the *Washington*. The company is furnishing for the U.S.S. *Indiana*, the



The U.S.S. "Tennessee."

One of nine Westinghouse Electrically Equipped Battleships and Battle Cruisers, Forming the Nucleus of the New American Navy



A Typical (G.E.) Electric Engine Room

Engine Room of the All-Electric Express and Passenger Ship *Cuba*, showing Starboard Side of the Propulsion Turbine-Generator

auxiliaries complete and principal parts of the propelling units; the latter being built by the navy department.

The same position established in regard to navy vessels by this company holds true for the new American merchant marine. On every sea, merchant ships equipped with Westinghouse turbines

an engine room either for turbine-electric drive or turbine-gear drive.

In arranging machinery in the engine room there are of course several fixed conditions. As in the case of single-screw ships the motor or the turbine-gear unit has to be placed on the centre line of the ship and at an elevation to suit the propeller shaft.

There are, however, a number of auxiliaries which, while they are independent of the main unit, should be given considerable thought in connection with the service to which they are to be applied, their location, accessibility, and proper installation.

The system of turbine-electric drive has more flexibility in the placement of machinery than any other type, as the turbine generator can be placed amidship with the boilers while the motor can be placed aft. The turbine generator can be placed on the side of the centre line of the ship, or can be placed over the condenser: either arrangement has arguments in favor of it, depending on the design and class of the boat.

In cargo boats with full lines a very economical arrangement is to have the turbine generator amidships with the boiler room and the motor aft, thereby saving considerable engine-room space, shaft and shaft-alley in the cargo space.

Figs. 1 and 2 show an arrangement of a 3,000-s.h.p. engine room and motor room that would be suitable for cargo ships having the engine room amidship and the motor placed aft. Fig. 1 gives an idea of the flexibility of the turbine-electric drive arrangement, as the turbine generator can be placed well up in the ship so as to take advantage of the space over the boilers and this reduces the length of the engine room. This scheme of having the main unit elevated, which gives two or more flats, requires the minimum amount of cubical space as it not only cuts down the length of the engine room but also the width and keeps the machinery away from the ship's sides, thus giving additional bunker or fuel oil space, and in turn giving more cargo space for a given ship tonnage. There would naturally be space required back of the boilers and this could be carried to the ship's sides, in way of the engine room,

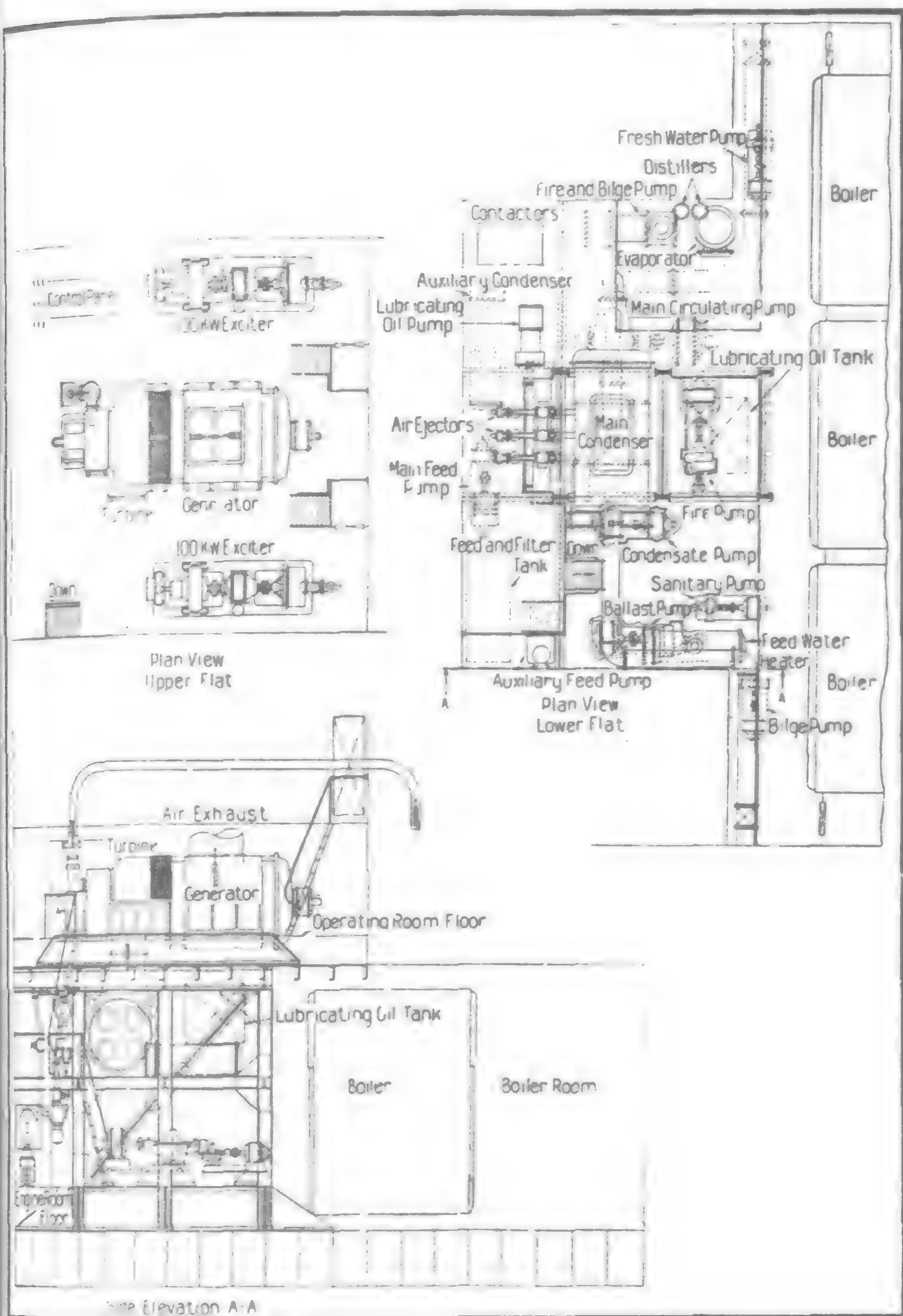


Fig. 1.—Diagram Showing the Location and Arrangement Amidship of 3,000 Shaft H.P. Turbine Generator Set and Equipment on a Vessel of Moderate Size

and reduction gears are bearing the world's commerce with speed, reliability and economy. To-day there are three hundred and twelve ships either built or building, with Westinghouse marine propelling equipment.

The great success which has attended the application of electric propulsion in the American navy and merchant marine, is sufficient reason for shipbuilders and shipowners in this section of the world to give careful study to the advantages resulting from its use in merchant steamers and tankers. *The General Electric Review* recently devoted a special number to the development of electrically-driven ships with some excellent plans showing the general layout for two distinct types. These will be of interest in connection with the mechanical end of the new Japanese naval service ship, and invite further attention to its adaptability for the equipment of steamers for general mercantile use. Mr. C. M. Rhoades of the construction department of the General Electric Company in describing the layout, construction and installation of propulsion equipment, and auxiliaries for marine drives says, that the overall efficiency and life of the main propulsion equipment is largely affected by the layout of the engine room, the construction of suitable foundations, and the proper installation of auxiliaries, piping cable and control; and this article is written to point out the most important features that should be kept in mind in arranging

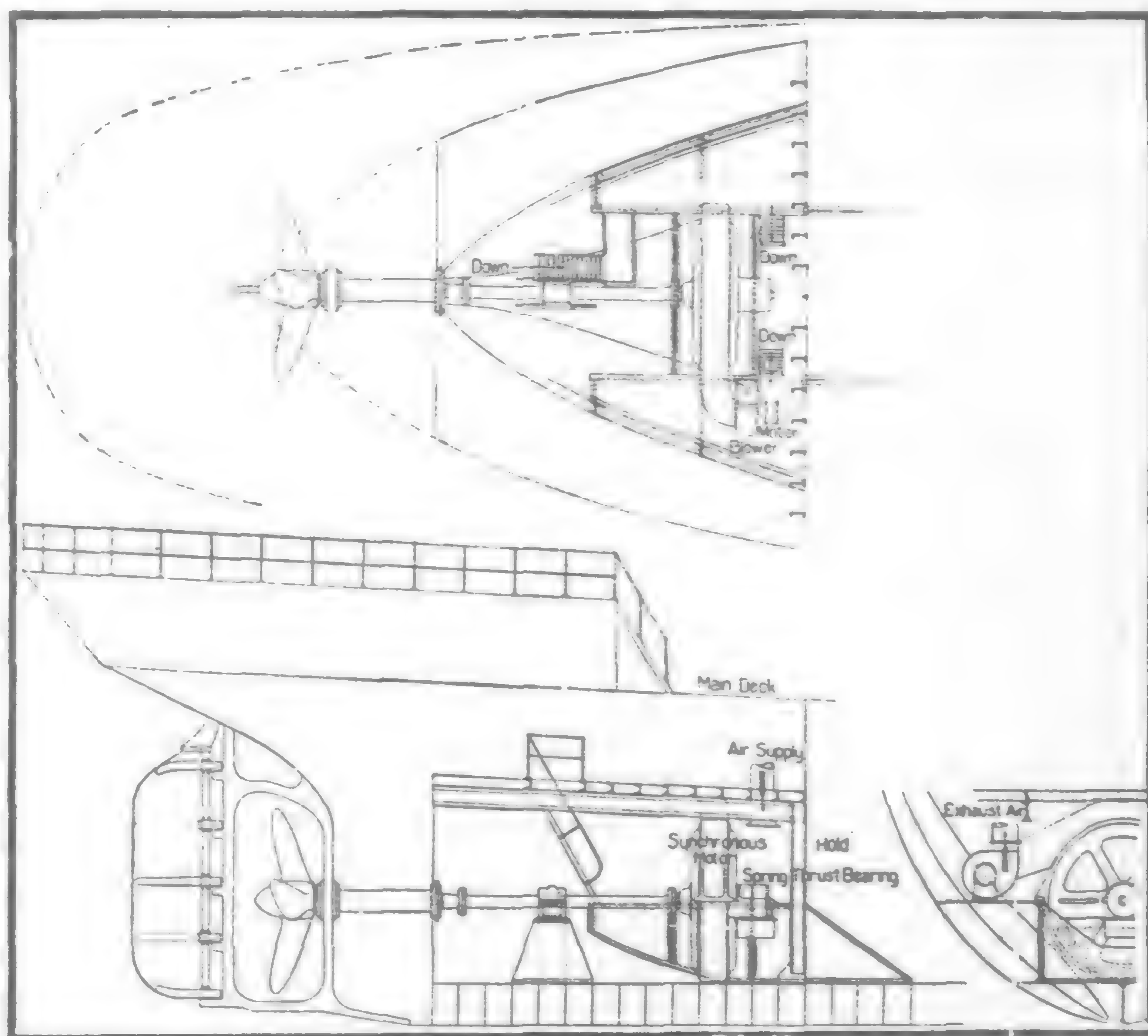


Fig. 2.—Diagram Showing Installation of 3,000 Shaft H.P. Propulsion Motor. The arrangements shown in Figs. 1 and 2 are related and apply to the same Installation

which space could readily be arranged to take care of any inlet or discharge piping from sea connections.

The engine room as shown in Fig. 1 is based on using electrically-driven auxiliaries and just enough steam units to maintain

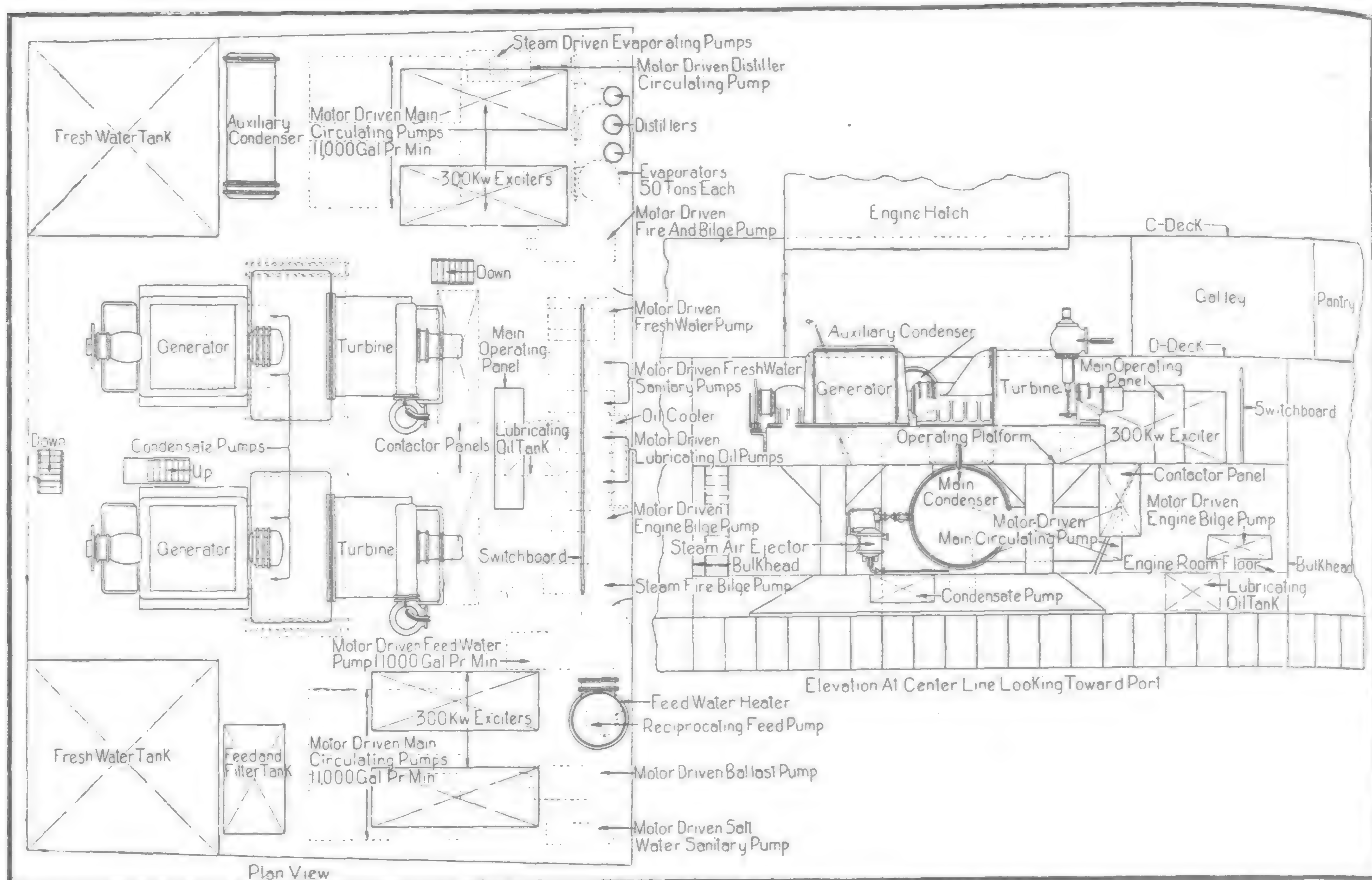


Fig. 3.—Diagram Showing Arrangement of Engine Room Amidship for 30,000 Shaft H.P. Twin Screw Vessel

a proper heat balance. The only steam-driven units are the turbine-driven exciters, the stand-by oil pump, fire and bilge pump, auxiliary boiler feed pump and the steam air ejector on the main condenser; all other auxiliaries are of the motor-driven centrifugal type.

The main turbine generator, the two auxiliary direct-current turbine generators, and the control panel are located on the upper flat convenient to the engineer on watch. The condenser is carried directly below the turbine, which is the most efficient location and

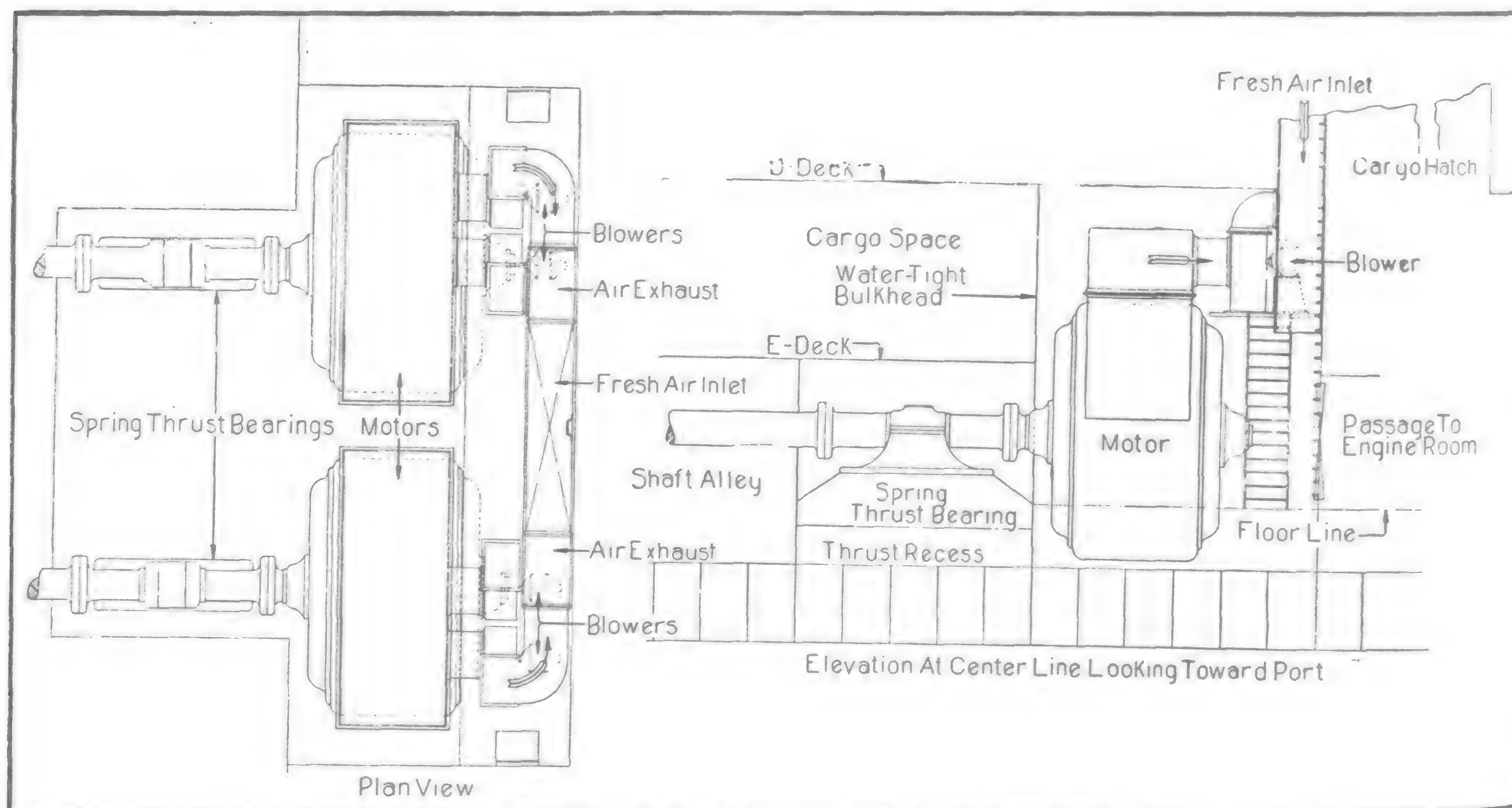


Fig. 4.—Diagram Showing Arrangement of Motor Room Aft for 30,000 Shaft H.P. Twin Screw Vessel

insures the turbine casing being drained at all times. This arrangement possesses a decided advantage over that of top exhaust units where the proper drainage of the turbine casing has been neglected and the life of the turbine unit been reduced by running turbine wheels in water.

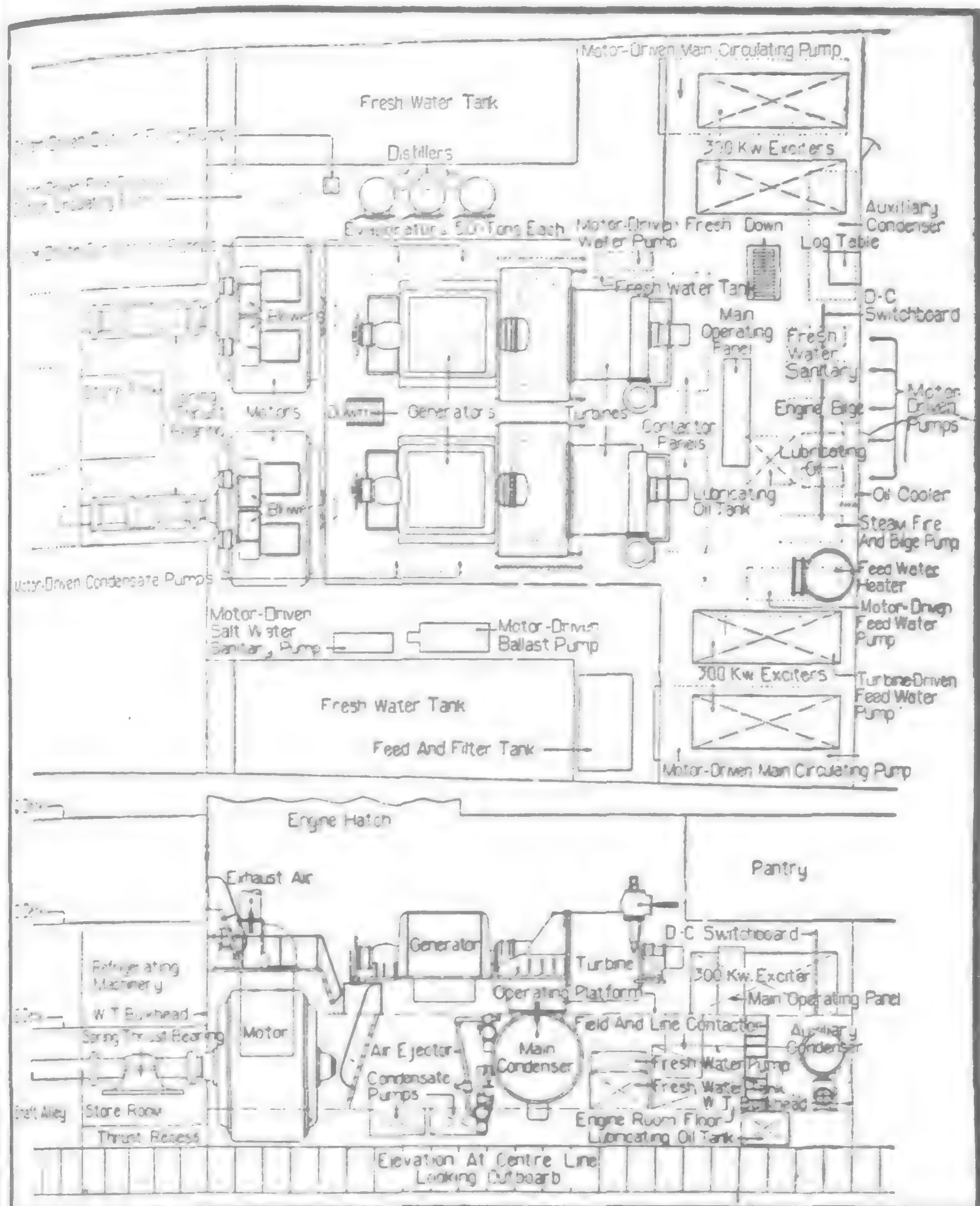


Fig. 5.—Diagram Showing the Equipment of Figs. 3 and 4 Installed in the same Compartment. This arrangement of Apparatus occupies more space and is less desirable than that represented in Figs. 3 and 4

This arrangement also eliminates the rather complicated exhaust trunk which is necessary in top exhaust units and also gives a very good distribution of weights, as the main unit and condenser are symmetrical about the central line of the ship. It is also possible to place directly beneath the operating panel, on a flat, the main contactors or switches for handling the current to the motor. These contactors can be either electrically or manually controlled from the operator's position, so that the engineer has entire control of the propulsion equipment and the main turbine at the control panel.

On the lower or engine-room floor are located all of the ship auxiliary pumps which when motor driven can be compactly arranged, as all steam and exhaust piping, which is a large factor in congesting the engine room, is eliminated.

This arrangement also lends itself to very simple and safe wiring, as all the cables can be carried underneath the turbine flat where they can be well supported and protected and led directly from the generator terminals beneath the generators to the contactors and switchboard, and all wiring to auxiliaries can be carried overhead to the motors. With due consideration to placing auxiliaries on the engine-room floor, the arrangement could be made to be very free of piping and a safe and efficient room obtained.

The motor room as shown in Fig. 2 can be placed as far aft as the lines of the ship will permit, and still have a satisfactory foundation for the motor and ample room for drawing the tail shaft. The motor shown in Fig. 2 is arranged to have the thrust taken up in the forward end of the motor.

The wiring to the motor room may be carried either in a wiring passage at one side of the ship between engine room and motor

room or may be carried above decks. The decks above can be covered, leaving only the necessary openings for access ladders and for air supply and discharge ducts. To provide for the removal of a portion of the motor, a section of the bulkhead forward of the motor could be made removable and motor taken out through the cargo space and hatch.

Figs. 3, 4 and 5 show arrangements for a 30,000-s.h.p. twin-screw ship, Figs. 3 and 4 showing the engine room amidship and the motor room aft, while Fig. 5 shows the same equipment with motors in the engine room.

In both arrangements shown in Figs. 3 and 5, the main turbine generators and auxiliary generators, together with the control panel and switchboards, are all located on the upper flat convenient to the engineer on watch. The condenser and all auxiliaries are located on the engine-room floor beneath.

Practically all auxiliaries are electrically driven, there being just sufficient steam units to give the proper amount of exhaust steam for feed-water heating. In this arrangement, additional flexibility and insurance has been obtained by having two circulating pumps for each condensers. The engine room in both cases takes up the full width of the ship.

The saving in space by the arrangement shown in Fig. 3 as compared to that in Fig. 5 is self-evident; the engine room would be 12 to 14-ft. less in length, which saving is of considerable value.

Fig. 4 shows the space required for the motor room aft. As previously stated this motor room should be placed as far aft as

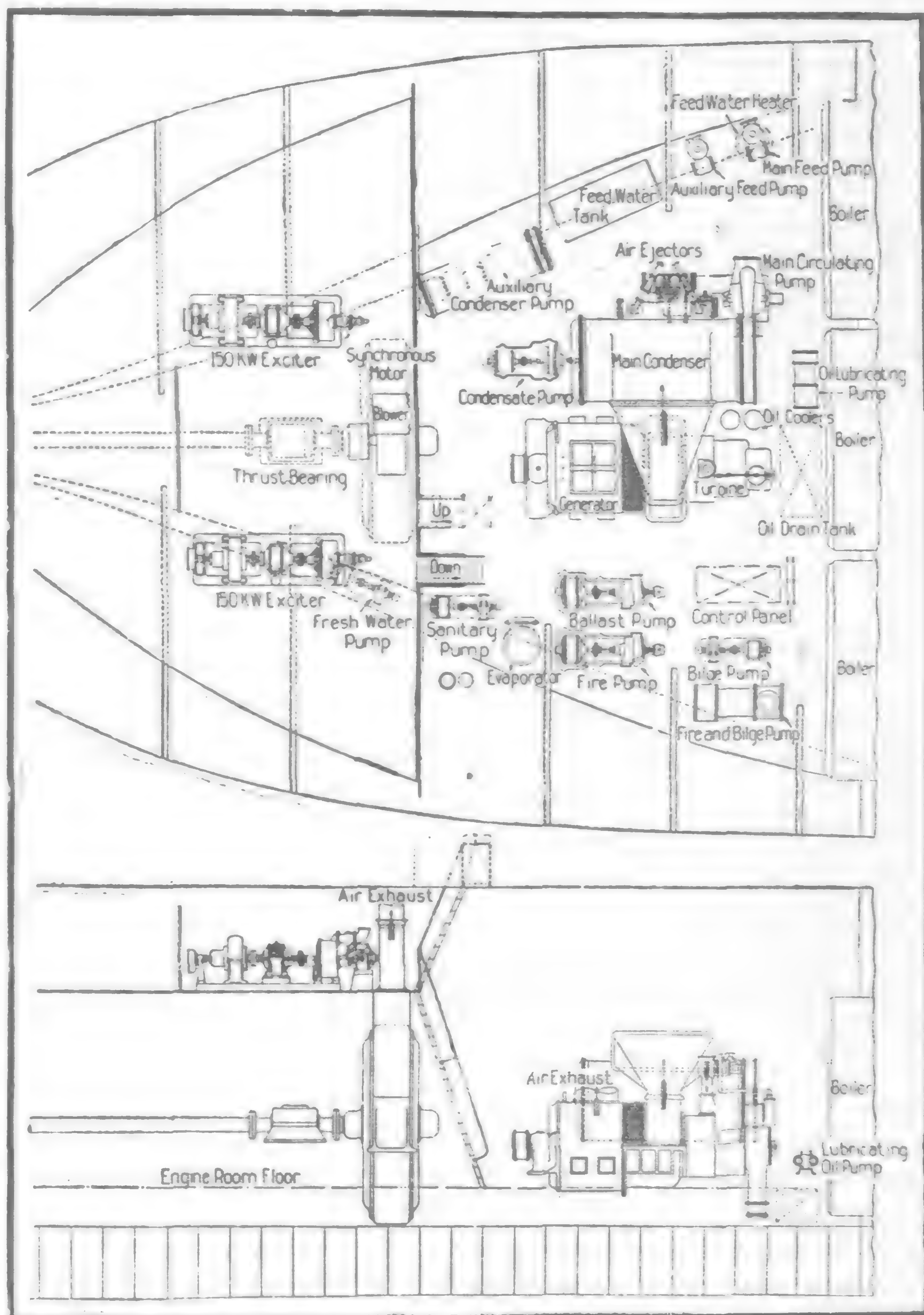


Fig. 6.—An Arrangement of Turbine-Electric Drive for Single Screw Vessel in which all Apparatus is Placed Aft

the lines of the ship will permit, thereby eliminating as much shafting and shaft-alley as possible.

Fig. 6 shows an arrangement for a turbine-electric driven single-screw tanker, or any other ship in which all machinery is placed aft. In this arrangement the main turbine generator is placed down on the engine-room floor with top exhaust, and the only apparatus carried on the upper flat are the two auxiliary direct-current turbine generators. The same scheme of electrically-driven auxiliaries has been carried out as in the other arrangements described.

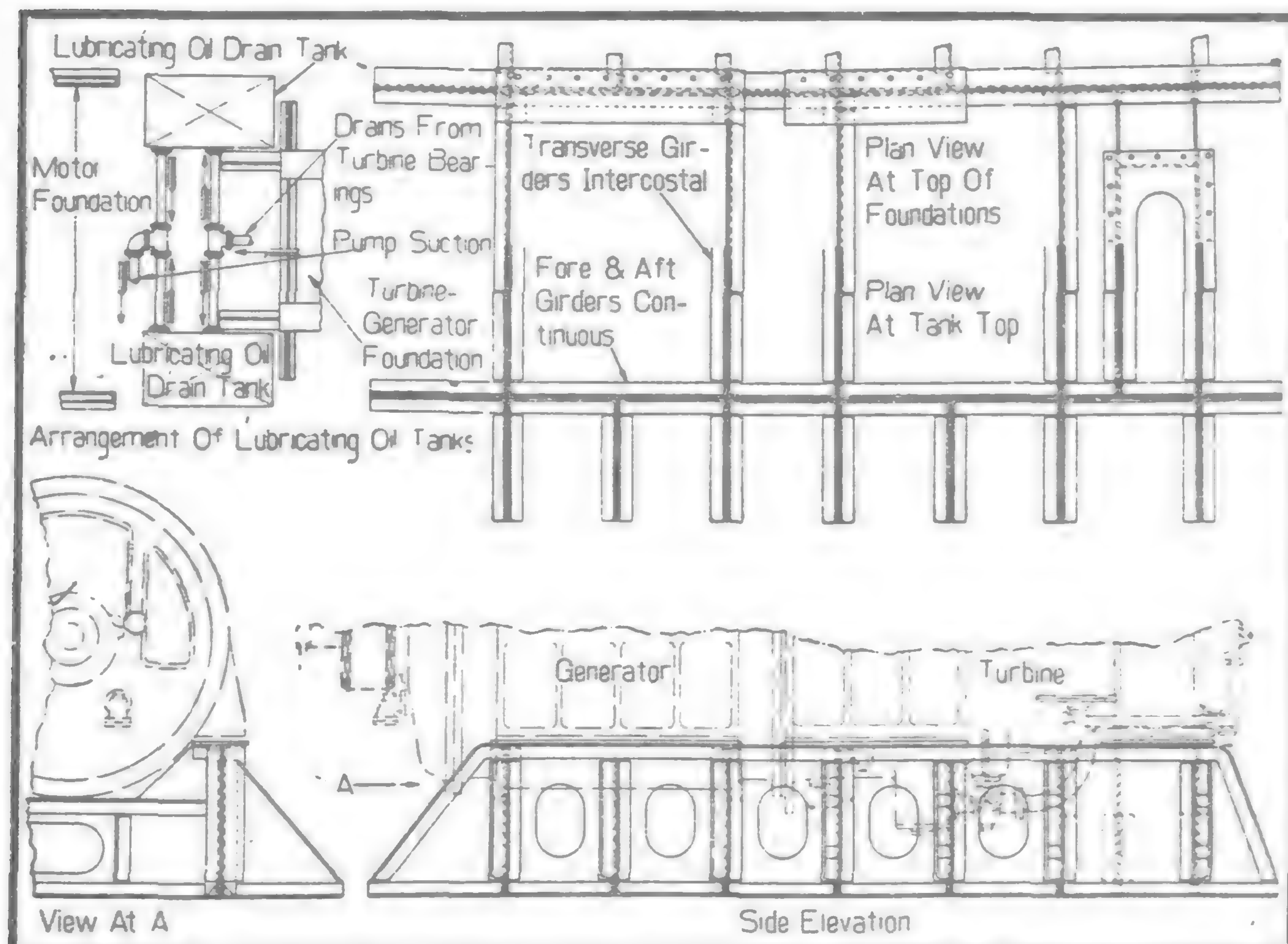


Fig. 7.—Typical Foundation for 3,000 Shaft H.P. Turbine Generator

In all arrangements of engine rooms, one should keep in mind the service and duty of each auxiliary because the proper type of drive, grouping, and arrangement will eliminate a great deal of duplication in piping, as the pumps that are to be interconnected to the same service should be arranged as closely together as possible. Also, all pumps should be kept above the engine-room floor and be accessible, for the best safeguard for keeping a pump in satisfactory operating condition is to have it where a man can see it and readily get at all its parts.

The matter of proper foundations for marine turbine generators, motors and gears is one that should be given very careful consideration, as the proper functioning and life of the equipment depends upon true alignment and keeping of this alignment under all conditions of service and operation.

Fig. 7 shows a typical foundation for a 3,000-s.h.p. turbine generator which would be placed on the upper platform as shown in Fig. 1 or on the tank top as shown in Fig. 6. This foundation consists of two fore-and-aft girders of sufficient depth to insure the after, middle, and forward bearing points being kept in line regardless of the working of the ship. The generator and turbine after foot is carried directly on the side girders, while the forward turbine foot is carried on athwartship plates framed into the longitudinal girders in such a manner as to carry the weight of the forward foot to the longitudinal girders and to also insure sufficient flexibility to take care of the expansion in the forward end of the turbine due to the changes in temperature of this portion of the unit.

When the turbine generator is carried on the tank top, this foundation should extend over as many frames as possible so as to distribute the loading and prevent concentration. When the unit is carried on the upper flat, a somewhat similar foundation should be placed under the turbine and also on the tank top, both of which should be properly framed to take care of the supporting columns. The girders are framed together at several points and are also provided with outside gusset plates to insure proper bracing against rolling.

The entire foundation is built up of plate and angles provided with rider plates in way of all bearing points, which plates should

be ground off to facilitate the fitting of liners, which should be not less than 1½-in. thick. All bolts for bolting down apparatus to foundations should be fitted bolts.

A typical foundation for a 3,000-s.h.p. motor consists of two fore-and-aft deep girders, one under each foot of the motor. The girders are well gusseted to the tank top and are tied together on the forward and after sides by means of plate work, which should form a water tight pit in which the motor sits. These plates on the forward and after sides should be made with a removable section to permit the drawing of the motor rotor.

As in the case of the turbine-generator foundation, the motor foundation should be distributed over as many frames as possible.

The General Electric Company makes a two-plane type turbine reduction gear and several of these have been installed in place of the single-plane type. Fig. 8 shows how readily this can be done with a minimum amount of work to the existing foundation.

The work to be done in making this change is the adding to the width of the foundation for the low-speed gear feet which are wider in the case of the two-plane type, the providing for the supporting of the turbine which has been raised approximately four feet, and a new exhaust trunk. The supporting of the turbine in its raised position is taken care of by a superseating structure which supports the forward turbine foot and the high-speed gear foot and is built up in the shop and attached to the existing foundation.

By actual experience, it is proved that practically all of this steel work for the superseating and exhaust trunk can be gotten out in the shops and assembled before the ship arrives; and this change from single-plane type to two-plane type of gear can be made in a very few days with naturally a corresponding minimum of expense. The turbine in its raised position requires the fitting of extension rods to the throttle levers if these are still to be operated

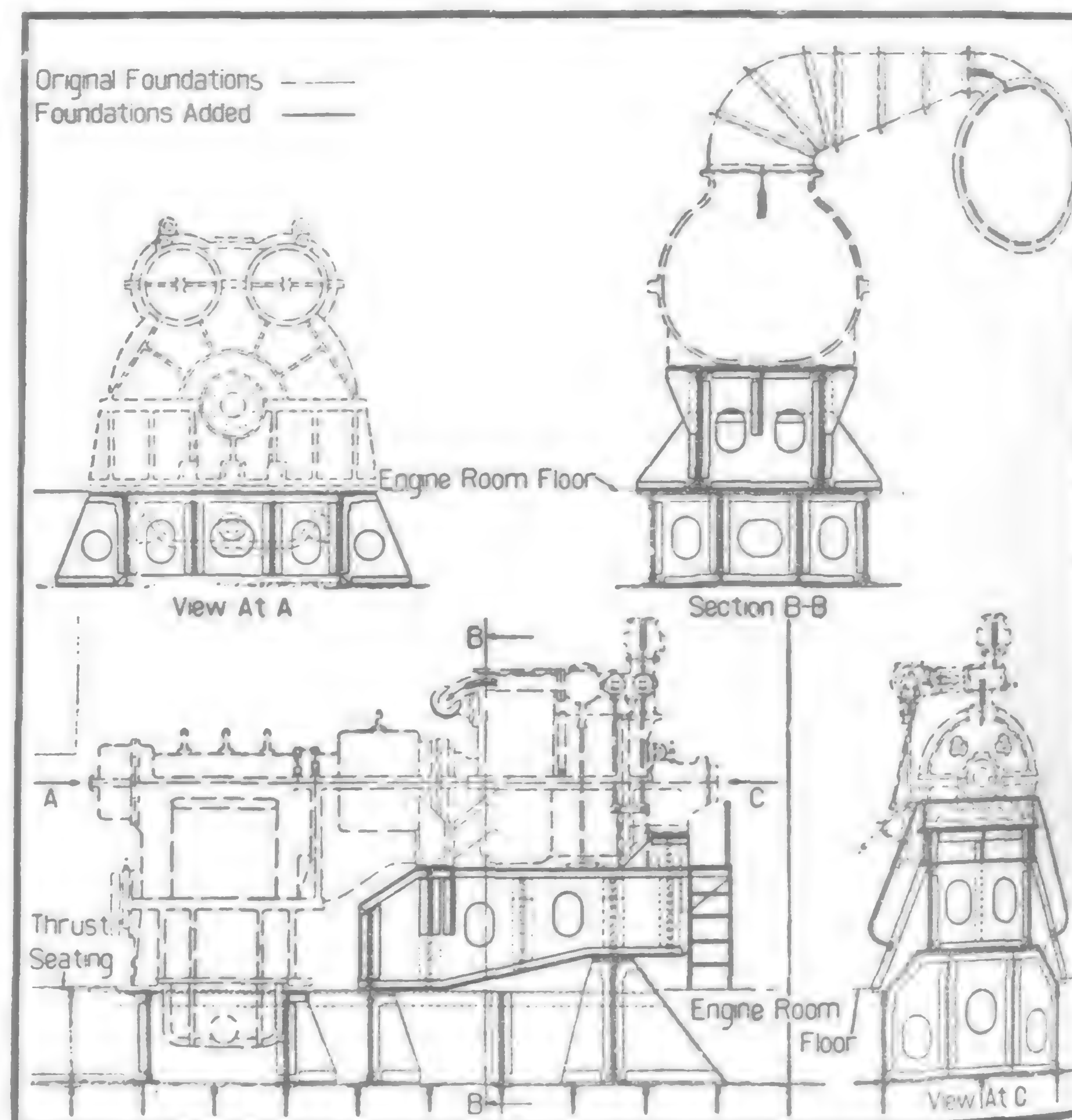


Fig. 8.—Diagram Showing Changes in Foundation Required when Substituting Two-plane Reduction Gear for Single-plane Gear

from the engine-room floor, but this is readily done as shown in Fig. 8.

In all cases where this change has been made it has required very little work, if any, to the remainder of the ship aside from the foundation.

The Hidachi Copper Smelter

Chief Features of this Large Japanese Works

By Charles F. Mason

TO many American smeltersmen the Hidachi copper smelter, at Ibarakiken, Tagagori, Hidachi-mura, Japan, is known principally as "that Japanese copper smelter where they have the highest concrete stack in the world." It is interesting to learn that this stack was built several years ago, not with the idea of establishing a world's record in chimney construction, nor because its great capacity was really needed from a metallurgical standpoint, but to protect the tobacco which is grown in the vicinity from the effects of the sulphur fumes. The stack rises 550-ft. from its foundation on the top of a hill about 200-ft. above the smelter

per cent. of custom ore, of which one-third is siliceous ore carrying about 3 per cent. copper, and two-thirds gold and silver-bearing quartz, containing about 85 per cent. silica. The latter is used for converter flux. As received at the smelter, all of the ores contain about 40 per cent. fines, separated by a $\frac{3}{4}$ -in. grizzly.

The green-ore fines and blast-furnace flue dust are sintered together in large cast-iron tapered "pots," with great bottoms, 12-ft. in diameter and about 4-ft. in depth, having a capacity of sixteen tons per charge. A stand for one of these sintering pots consists merely of a metal ring, set about 4-ft. below the floor level, which makes contact with the lower edge of the pot all around



(1) View of the Big Stack from the Offices. (2) The Blast Furnace Plant, showing Endless Ropeway from Sintering Plant. (3) Sintering Plant.

and 1,220-ft. above the level of the sea, three or four miles away. It stands several hundred yards away from the nearest point of the smelter proper, to which it is connected by a main flue and a number of branches, all of which are built of reinforced concrete. It is said to have a capacity of a million cubic feet of gases per minute. Even with its great height, it is necessary to curtail smelting operations at certain times during the tobacco- and rice-growing season, when the observation stations in the vicinity report the wind in a dangerous quarter.

The ores smelted at Hidachi consist of about 70 per cent. of cupriferous pyrite from the Hidachi mine (both smelter and mines are owned and operated by the Kuhara company), and about 30

the circumference of the latter when placed upon it. Inside of this ring is an opening which is connected with the blast main, and outside of it is an annular space which is connected to the flue, and thence to the stack. A thirty-ton overhead traveling crane places an empty pot on a stand. Rough straw mats are spread over the grates in the bottom of the pot and set afire. A sheet-steel hood, shaped like a truncated cone, the diameter of its base being slightly larger than the outside diameter of the annular flue, with inspection doors in the sides and charging doors in the top, is lowered into place over the whole, and the blast turned on slightly. Then a charge of ore and flue-dust is dumped in by the crane from a five-ton bucket with a bell-hopper bottom,

followed, when it is well lighted, by a second and then a third. The average time required for sintering a sixteen-ton charge is about five hours, and the maximum blast pressure is about fifteen ounces.

When the sintering process is complete, the hood is removed and the pot with its charge is carried by the crane to the breaking floor, where the charge is dumped and broken up by an electromagnetic "skull cracker," the pot being ready for another charge as soon as replaced on a stand. The sintered material, after being broken up, is passed over a 1-in. grizzly, where about 20 per cent. is removed and reverted to the sintering process, the remainder going to the blast furnaces by means of electric locomotives and an endless ropeway.

There are ten blast furnaces, all 48-in. in width at the tuyères and of lengths as follows: three 15-ft.; three, 20-ft.; two, 24-ft. and two, 40-ft. Only seven of the smaller furnaces are in operation at this time, six for first matting and one for matte concentration. The tonnage smelted varies from 170 tons of ore, for the 15-ft. furnace, to 250 tons, for the larger furnace, per furnace per day. The ore-column in all cases is about 11-ft. high, and a maximum blast pressure of twenty ounces per square inch is used. A 20 per cent. copper matte is obtained from the first furnaces, and is concentrated to about 35 per cent. in the second. Water-cooled fore-hearths, of probably fifteen or twenty tons' capacity each, are used, one to each furnace, and the first matte is tapped into the pans of an endless conveyor, to facilitate cooling and breaking up. The first-matting furnaces are situated in parallel positions and charged through side doors in the tops by hand, whereas the matte-

ladle-cars into which the matte-concentrating furnace settlers are tapped. There are six converter stands. The tilting device consists of a vertical hydraulic plunger, operating a rack which engages a gear on the converter trunnion. The converter blast is supplied by a motor-driven turbo-blower at a pressure of 8-lb. per square inch, and each converter has eleven $1\frac{1}{4}$ -in. tuyères, only nine of which are open in a new lining. The slag carries an average of 2.5 per cent. copper, and is reverted, cold, to the first-matting furnace. The blister copper is cast into 24 by 30-in. anodes, weighing

TYPICAL ANALYSES—HIDACHI SMELTER
KUHARA MINING CO.

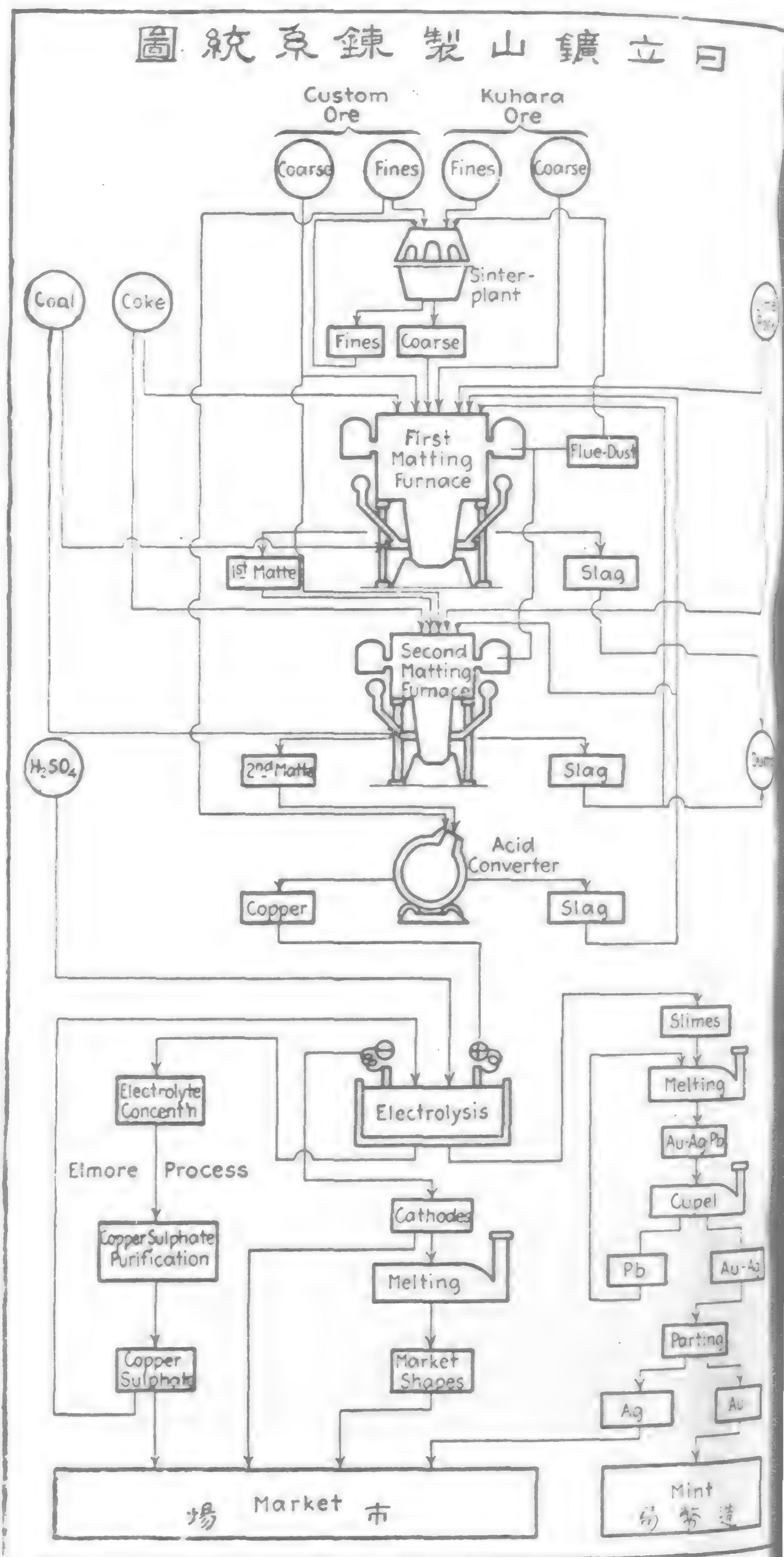
Material	Cu	Pb	Fe	Zn	SiO ₂	Al ₂ O ₃	BaSO ₄	S	CaO	MgO	MnO	CO ₂	SO ₃
Hidachi No. 1 ...	2.9	...	28.8	1.8	23.8	6.2	0.8	29.5	0.8	3.4	0.3	...	...
Hidachi No. 2 ...	3.0	...	30.0	1.9	18.5	6.2	1.2	32.5	0.9	3.9	0.4	...	...
Pyrite cinder.....	2.9	...	46.6	3.6	11.1	4.0	1.1	7.0	0.9	1.4	0.1	...	4.6
Custom Cu ore ...	7.3	0.2	13.6	1.2	55.4	5.0	0.4	14.1	0.4	1.4	0.1	0.02	...
Au-Ag flux	0.1	...	1.9	0.4	83.8	4.7	...	0.3	0.4	0.4	4.7	0.13	...
Sinter-cake	3.2	0.2	35.1	1.8	30.7	5.8	1.1	5.5	0.9	2.9	1.0	...	...
First slag	0.2	...	25.8	1.1	38.0	8.8	0.9	0.8	2.3	3.6	0.6	...	...
Second slag	0.4	...	...	...	41.0	...	...	...	...	...	...	...	...
First matte	20.0	...	...	...	...	...	...	...	...	...	...	...	...
Second matte ...	35.0	...	...	...	...	...	...	...	...	...	...	...	...
Converter slag ...	2.4	...	45.0	...	26.0	...	...	...	...	...	...	...	...

concentrating furnaces are end to end and are charged by bottom-dump cars running on a track over their tops. They have side flues, but the charging floor is remarkably free from fumes, thanks to the big stack. The flue dust is about 2.7 per cent. of the ore charged.

The fuel used in the blast furnaces is 7.5 per cent. of the ore charged, and consists of one-third coke and two-thirds bituminous coal. The former is charged in the usual way, with the ore and flux, whereas the latter is charged through the tuyères by means of hand-operated plungers working in small cylinders which are introduced through the tuyère caps. The coal is crushed previously to about 1-in. size, and a charge consists of about 7-lb. Needless to say, this method, although showing fuel economy from a metallurgical standpoint, is wasteful of labor, and plans are being made to use pulverized coal instead.

The copper recovery in all of the blast furnaces is apparently good, being reported as 90 per cent. or better for the entire plant. It will be noticed that the copper content of the first slag, as shown in the table of analyses above, is 0.2 per cent. and that of the second slag approximately 0.4 per cent. It is only recently that the second slag loss has been brought down to this figure, thereby cutting out a large amount of revert. All blast-furnace slag is granulated in water, drained, and hauled to the dump in electric cars.

Acid-line converters of the barrel type, 68-in. in diameter and 8-ft. long, receive the 35 per cent. matte direct from the small



Flow Sheet of Hidachi Smelter

about 400-lb. each, through a swinging launder, in stationary copper molds arranged in a semicircle and cooled with water jets underneath in the usual manner.

I am indebted to Mr. Tokuzumi, metallurgical engineer, and Mr. H. Kajikawa, mechanical engineer, of the Hidachi smelter, for their courteous assistance in securing the information and data presented in this article.— *Engineering and Mining Journal*.

The New Serum Laboratory at Alabang

By the Bureau of Science

THE serum laboratory of the Philippine bureau of science was moved to Alabang the latter part of March and actual operations in the manufacture of serums and vaccines were commenced early in April. It is conveniently located on the Manila-south road, 25 kilometers from the city, on the rising ground overlooking Lake Bay. While the plant is not yet perfect owing to certain small details of construction not having been finished, it compares very favorably with similar institutions abroad so far as its general equipment is concerned. For its specific purposes, which are really the function of a pasteur institute, the serum laboratory is admirably located and in the immediate future we should be able very radically to increase our output of serums and other biological products. For the establishment and equipment of the serum laboratory at Alabang great credit must be given to Dr. G. Apacible, secretary of agriculture and natural resources, who has consistently supported our plans for establishing this institution on a sufficiently large scale so that the products manufactured may be available in ample quantities to meet all demands. It is the only institution of its type in the Philippines and its products serve the entire population of the archipelago.

The standard products manufactured in the serum laboratory include the following:—antitetanic serum, antidysenteric serum, normal serum, vaccine virus, cholera vaccine, typhoid and paratyphoid vaccine, dysentery polyvalent vaccine, bacillus coli vaccine, gonococcus vaccine, staphylococcus albus and aureus vaccine, streptococcus vaccine, and the materials necessary for the pasteur anti-rabies treatment.

From the time the serum laboratory was transferred to the bureau of science in 1903 up to the year 1918 the quarters assigned to it were wholly insufficient to warrant any great development of the work. It was originally located on the grounds of the San Lazaro Hospital, but in 1906 was transferred to the grounds of the bureau of science. The laboratory space available in Manila was inadequate and, being in close proximity to the power plant of the bureau of science, was very poorly located for the purpose intended. Little space was available for animals, and up to 1916 but a single stable was available for housing all of the animals carried by the serum laboratory. Until proper space was provided in 1916 but six horses were maintained for the purpose of producing serums, and a small number of calves, for the purpose of manufacturing vaccine virus. With these strictly limited facilities, it was, of course, absolutely impossible for the serum laboratory to supply serums, vaccines and other biological products on a scale sufficiently large to meet all demands.

Up to the present time, owing to the limited facilities available in Manila, the bureau of science has never been able to produce certain essential serums in sufficient quantity to meet all demands. A notable example of this is antidysenteric serum, the demand for which invariably increases at the beginning of each rainy season. We have at times been obliged radically to restrict the sale of this product on account of the lack of reserve supplies, and at times have even been unable to supply all that the Philippine general hospital needed. With the ample space now available at Alabang, not only for laboratory and manufacturing purposes but also for the maintenance of the necessary live stock, the bureau of science should be able to produce all standard types of vaccines and serums in sufficient quantities to meet local demands.



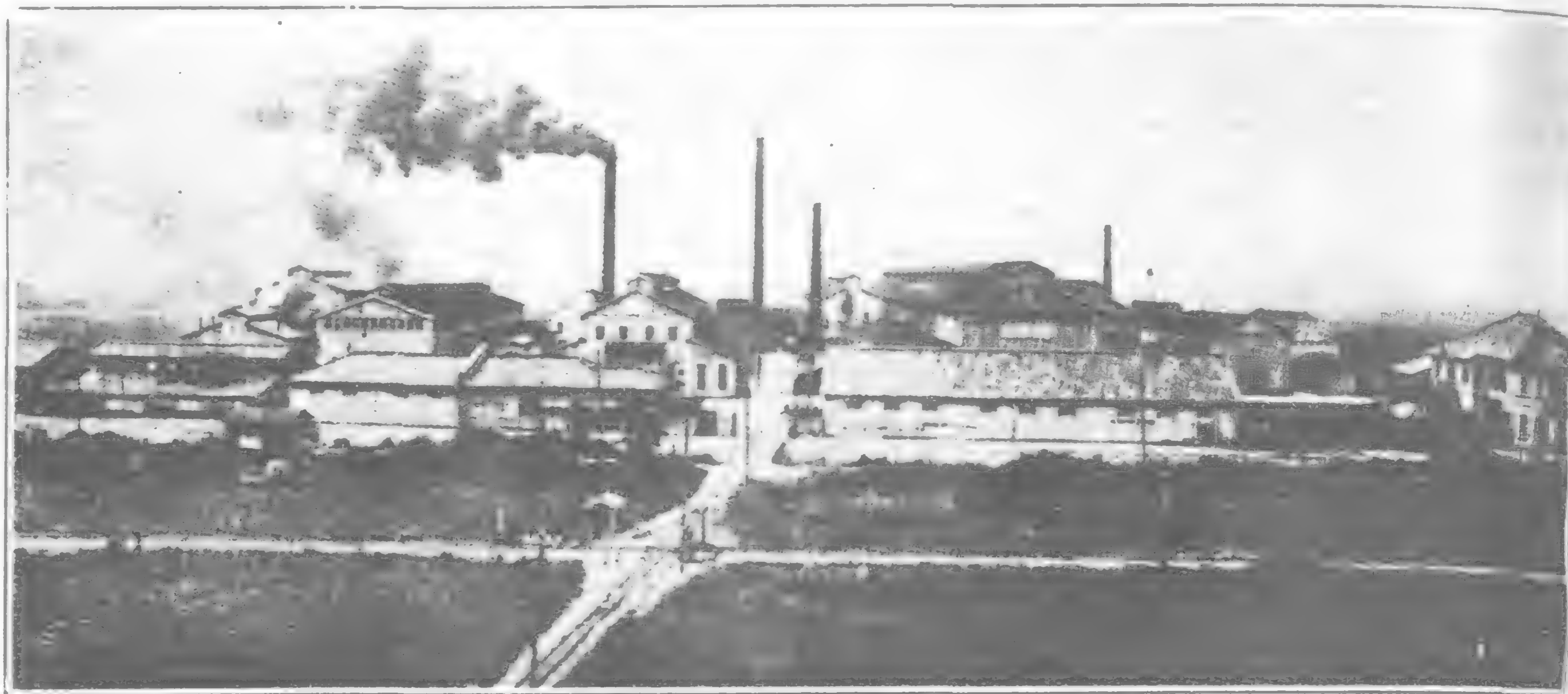
BUREAU OF SCIENCE BUILDING, MANILA

The Bureau was recently erected and is now operating a New Serum Laboratory and Pasteur Institute producing commercial serums for other parts of the Far East

Japan's Iron and Steel Industry

A VALUABLE contribution to Japan's iron and steel industry appeared in the *Times Special Japan Supplement*, of April 16. The following abstract of the article, which was written by Mr. L. P. Sidney, will be of interest to those who have not read the original in *The Times*. Mr. Sidney says that the contrast between the old methods of manufacture and those in vogue at the present day show the high degree of progress which is characteristic not only of this industry but of other industries of the island empire. At the same time it must be admitted that the progress has been less satisfactory from an economic point of view than from a technical standpoint. Indeed no less than ten years ago it was authoritatively stated that there was but one Japanese works which was on a paying basis. This was the Kamaishi iron and steel works, belonging to Chobei Tanaka, who made the first really successful attempts to manufacture iron and steel by modern methods, and may be said to be the real founder of the iron and steel industry of Japan. Magnetite ore of good quality, and limestone, had been discovered at Kamaisha as far back as 1823, and in 1864 there were ten small furnaces, each of a capacity of four tons of pig iron per day. The enterprise was acquired by the imperial government, but proved a commercial failure from first to last, although an enormous amount of money was spent in improving and enlarging the plant. In 1882

It was not long before the works became a success, and were the only iron and steel works in Japan which were being run at a profit. The plant now consists of eight blast furnaces, of which one is working on a charcoal burden, and the annual output of pig iron is about 70,000 tons. There are beehive retorts, ovens, and recovery ovens, and the coke consumption is about 32 cwt. of coke

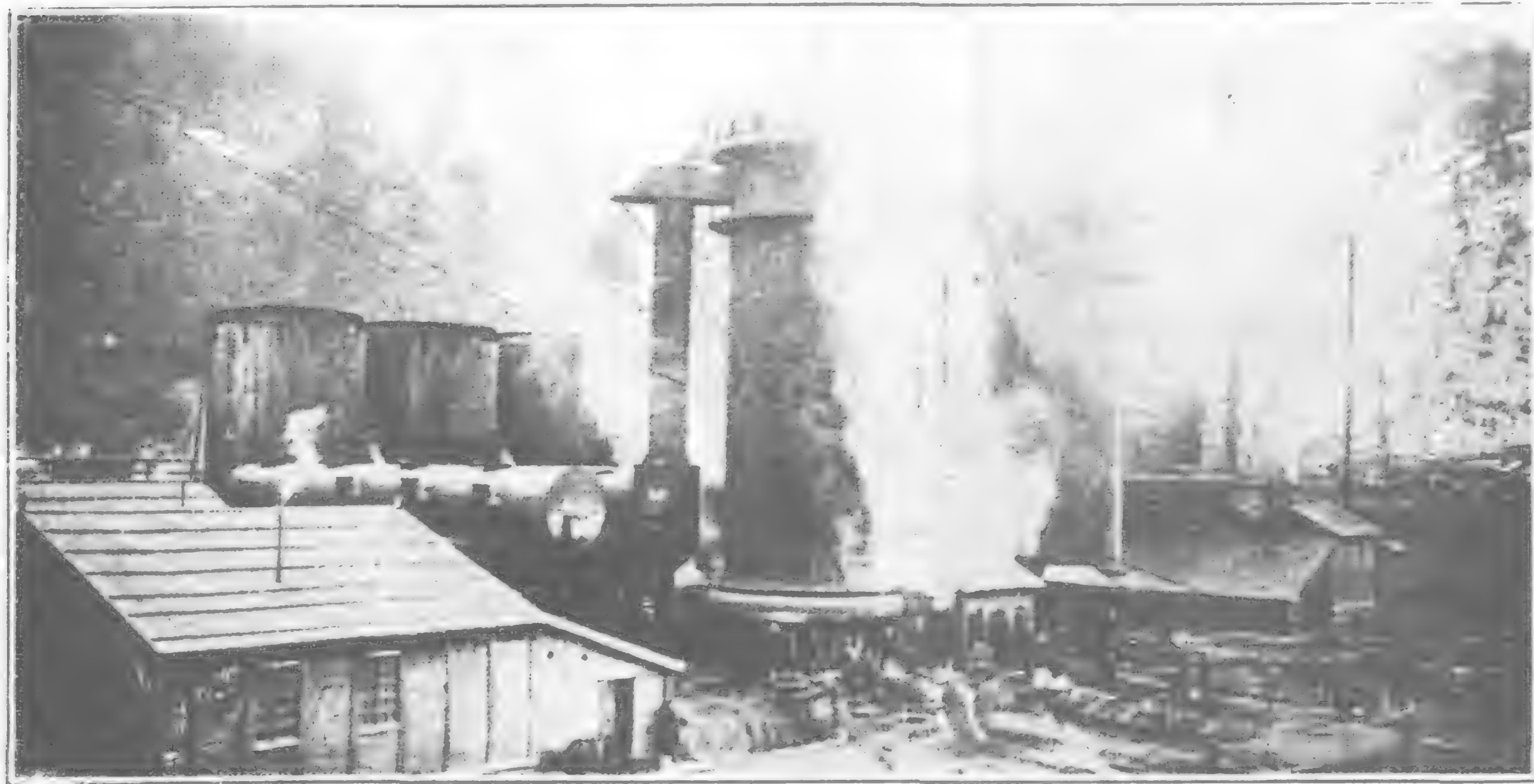


View of the Sumitomo Steel Works

per ton of pig. Ferro-manganese is also made, as well as spiegel, the coke consumption being $3\frac{1}{2}$ tons and 2 tons, respectively, per manganese and 12 per cent. spiegel. The company manufactures its own silica bricks for lining the blast furnace, excellent ganister being mined in the vicinity. There are four basic open-hearth furnaces of ten tons capacity each, and during the war two larger furnaces were erected. The works also include a number of three-high mills and a large pipe-casting department.

The manufacture of iron and steel by modern methods in Japan has been constantly fostered by the Japanese government, which, in 1899, established the Imperial Iron and Steel Works at Yawata-machi, near Moji, a harbor on the western coast of the Inland Sea, the aim being to make steel from European pig iron, the supply of which was fairly economical owing to the low freights then existing.

Some twenty years ago the blast furnace plant at Yawata was put to work on Chinese iron ores, the Japanese iron ore resources having proved inadequate. The capital expenditure on this plant alone has been something like £10,000,000, but it has been handicapped by lack of exper-

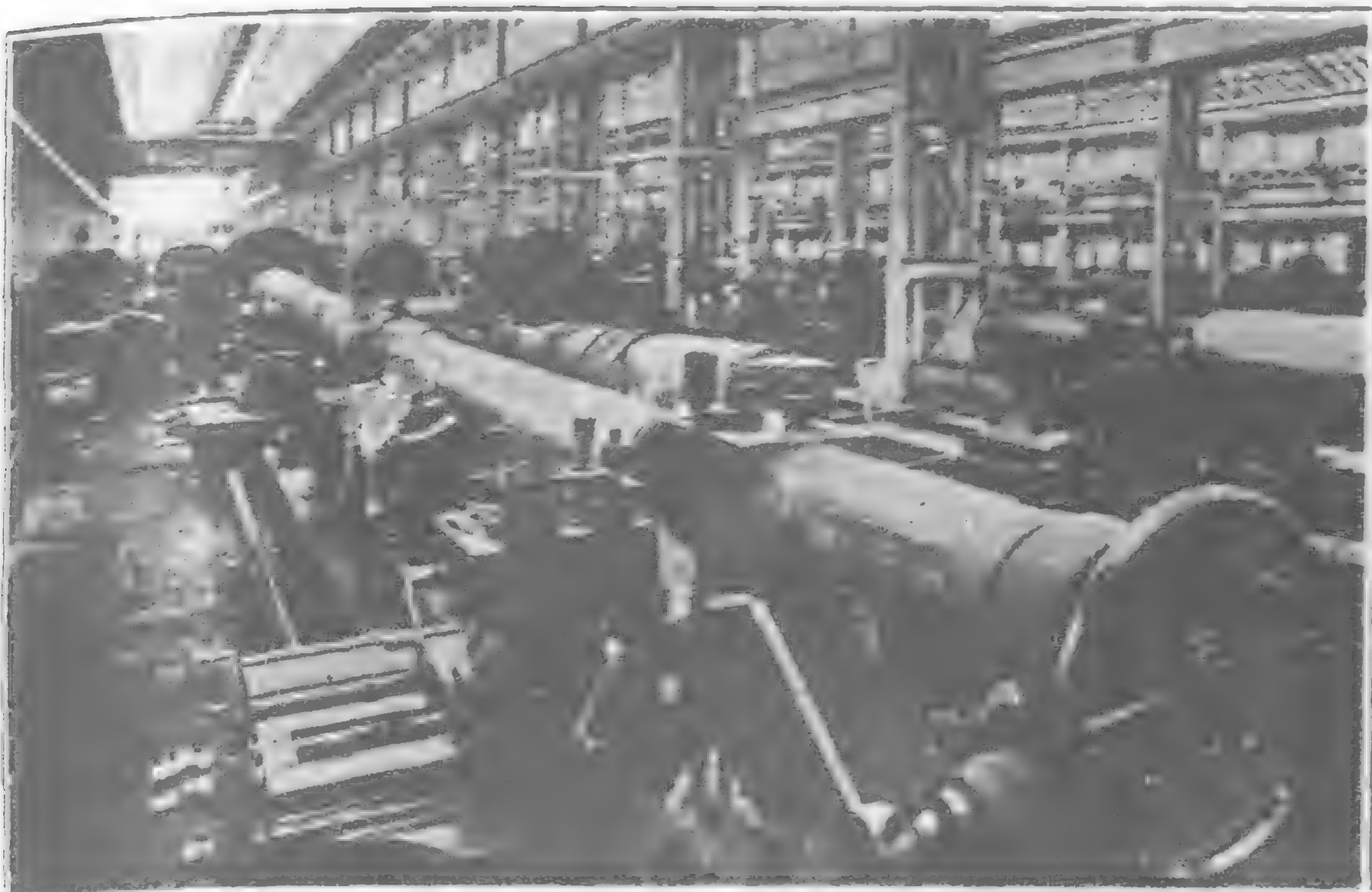


Blast Furnaces of the Kamaishi Iron Works

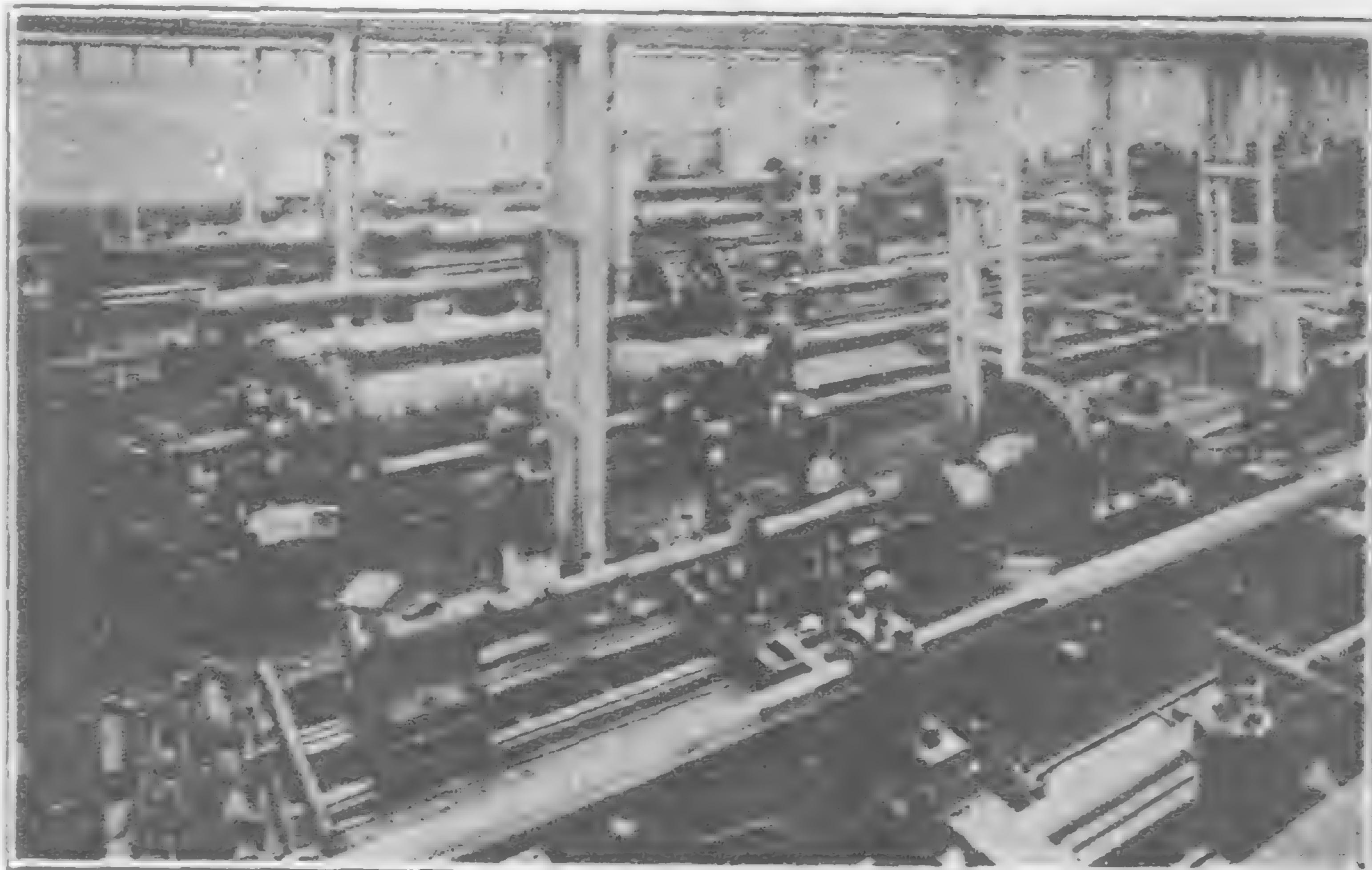
operations were suspended, as neither the quality of the material nor the economic conditions under which it was produced were satisfactory. Mr. Tanaka acquired both the mine and the works from the government in 1885, and the subsequent history of this works affords a striking example of the advantages of private enterprise.

ience and want of skill on the part of the workmen. The plant is, notwithstanding, the largest and most improved steel-works in the country, and has proved a valuable training school for metallurgists. It has a capacity of about 350,000 tons per annum. The coke plant consists of six batteries of six-ton

VIEWS OF THE JAPAN STEEL WORKS AT MURORAN



Rough Turning Gun Tubes



Gun Lathes, Machine Shop

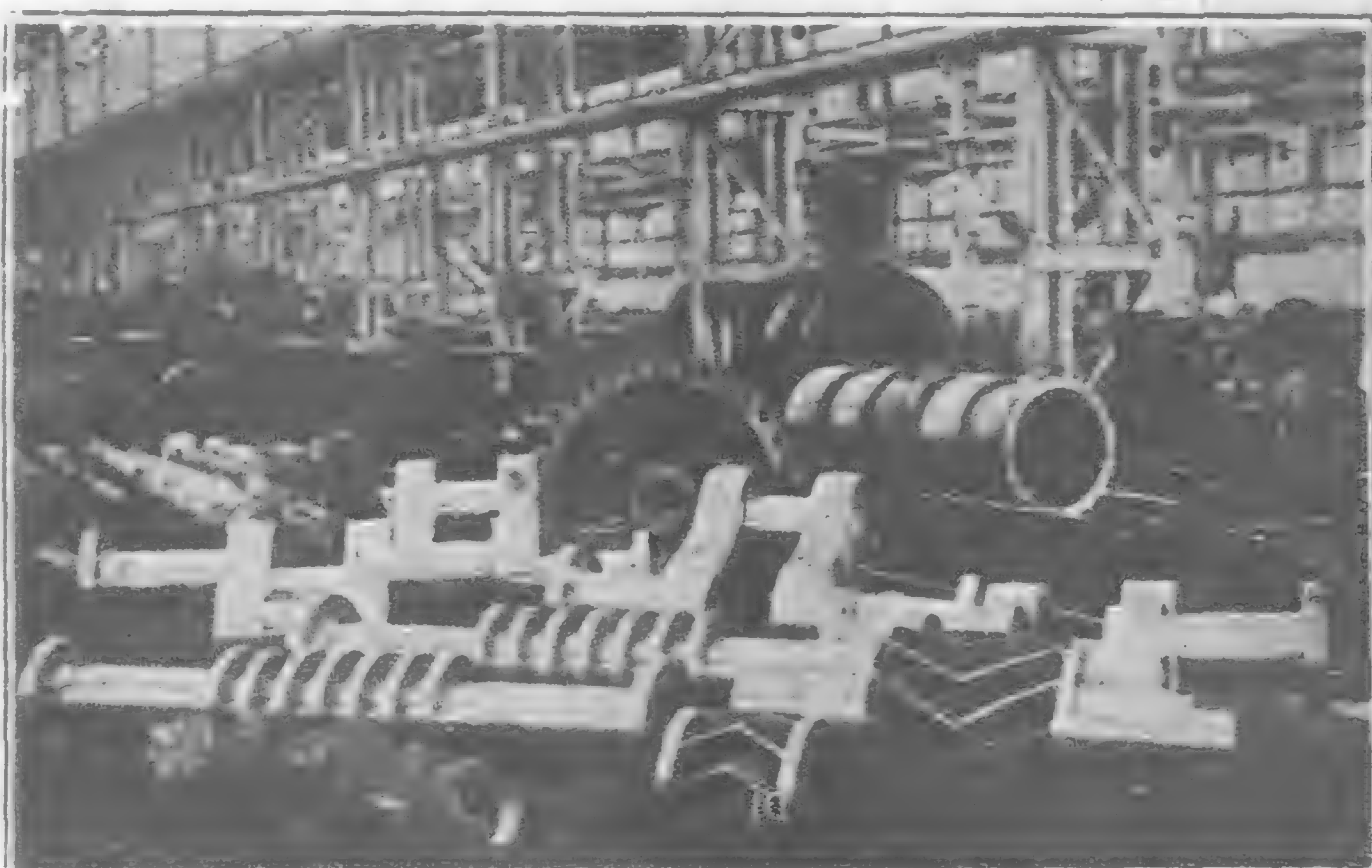
Semet-Solvay ovens, comprising 150 ovens, and a battery of 120 Koppers ovens. There is a large and well-equipped by-product recovery plant. To the five fairly large modern blast furnaces already in use a sixth, in course of construction, is being added.

The five furnaces already erected have a capacity of 250 tons of pig iron each. The capacity of the new blast furnace will be

smaller furnaces of 15-ton and 10-ton capacities respectively. The mill department includes rail, bar, medium and small mills, besides plate and sheet mills, and the aggregate horse-power capacity of the plant is 30,000. The number of workpeople employed is 10,000. Orders have been placed in the United States for electrical equipment intended to supersede the existing steam-driven 40-in. reversing mill. The new mill will be operated by a 3,500



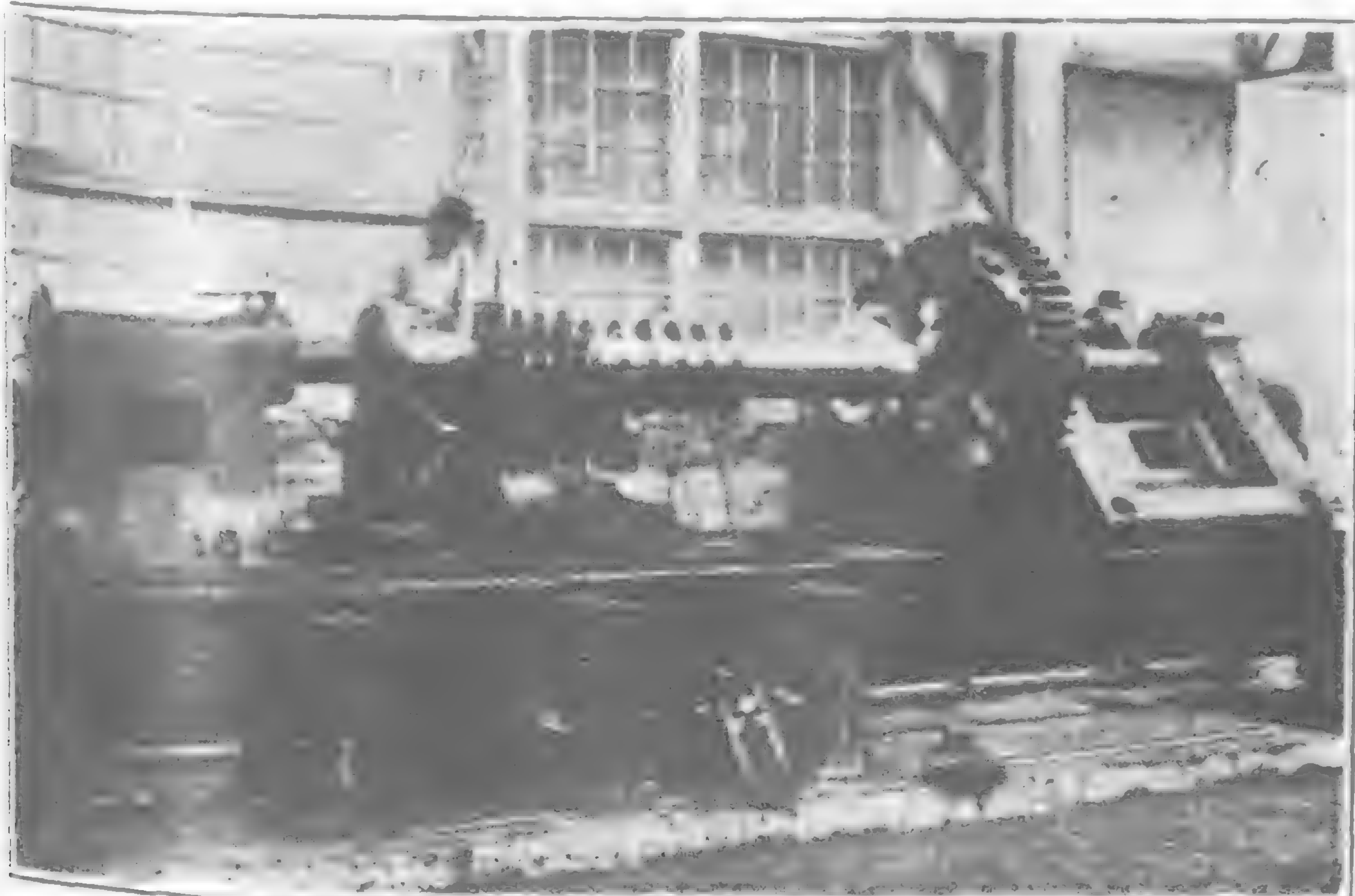
Machine Shop



Various Products

about 300 tons. Each of the furnaces is provided with four Cowper stoves. The charges are taken by an inclined hoist to the furnace top and dumped on to a double bell contrivance of modern type. The steel plant is on a large scale. There are twelve 25-ton open-hearth furnaces, six 50-ton furnaces, two 60-ton furnaces, and two

single-unit motor, and will be capable of rolling 50 tons of steel per hour from ingots measuring 20-in. square. A new slabbing mill is also to be installed, to roll steel ingots up to 25 tons in weight. Much of this machinery has been delivered, but the conditions in the trade are such that the plant has not yet been got to work.



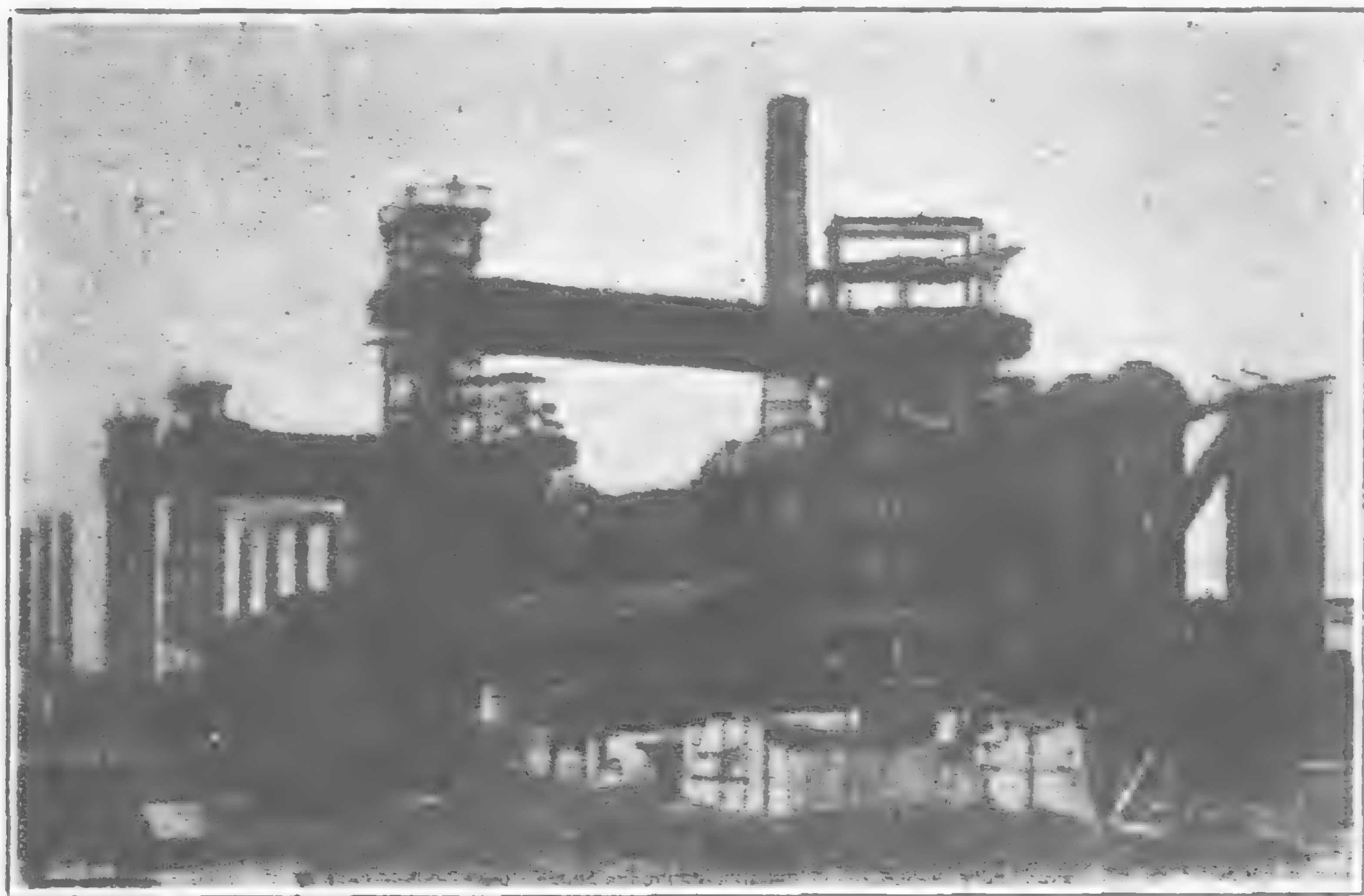
Turning a Thrust Shaft



Crank Shaft Lathe

Government Arsenals

Besides the imperial steelworks, the government also have a naval arsenal at Kure, at which close on 5,000 workpeople are employed. There is also an important arsenal at Muroran, equipped with the most modern plant and machinery, and comprising blast-furnaces, steel furnaces, and rolling mills, besides ordnance



Blast Furnaces at the Imperial Steel Works, Wakamatsu

and small arms works. In addition to ordnance requirements it is intended to manufacture railway wheels, axles, rails, girders, and structural steelwork.

Amongst other private enterprises should be mentioned the newly-projected Kiushiu steelworks. This plant will have three 50-ton basic open-hearth furnaces, and should circumstances justify the future development five additional furnaces are contemplated. The rolling mills will be electrically driven, and will comprise a 32-in. blooming mill, an 84-in. plate mill, and a 24-in. structural mill. The whole of the machinery and equipment for this works has been purchased in the United States. A new blast-furnace plant with a capacity of 150,000 tons per annum, is also being built by the Toyo Company at Kiushu, and a new plate mill is being put down for the Imperial Steelworks Kobe plant. This mill will be the second largest plate mill in the world, being a standard two-high mill for the rolling of plates up to 180-in. in width and 2-in. thick. An interesting feature of this plant is that some of the auxiliary motors will be of Japanese manufacture, the "Shibauka" type, 84 h.p., having been selected. The main drive will be by means of a twin tandem compound reversing rolling mill engine, 44-in. by 70-in. by 60-in.

The "Black Country"

Kiushiu may be described as the "black country" of Japan, but there is a rival iron trade centre in the northern island of Hokkaido, where there are a number of blast furnaces, as well as the Muroran Arsenal, to which reference has been made. The Nippon Steel Foundry in Hokkaido was the result of the co-operation of the Mitsui Company with Messrs. Armstrong & Co. and Messrs. Vickers, Sons, and Maxim, Limited. It was originally designed to treat local iron sand concentrates, but has more recently been converted so as to deal with imported ores from China. Several other ironworks exist in Hokkaido, amongst which may be instanced the Wanishi ironworks, with two blast furnaces. At Osaka there are both iron and steelworks, the most modern being the Sumitomo steelworks, consisting of one 15-ton acid and one 15-ton basic open-hearth furnace. Near Osaka a rich ferruginous earth occurs, containing from 65 to 95 per cent. of iron oxides. A project has been put forward for an electrolytic process of manufacturing iron from this material, the estimated cost being £5 per ton. An

experimental plant was to have been established near Kensaki, but, according to the latest reports, the scheme has been abandoned.

New works have also been established recently at Karatsu, and amongst the older works may be mentioned the Fuji Oshima Iron and Steel Company and the Nitto Ironworks, also works at Kobo and Tokai. The Nitto works are laying down a tinplate plant, but there has been considerable delay in securing the machinery from the United States. Tinplates will also be made at Yawata

Small Works

Before the war there were approximately 250 small works and 12 to 16 blast furnaces in Japan. During the war many of the small works were either amalgamated or ceased operations, while the larger works were greatly extended and enjoyed a brief period of unparalleled prosperity. Dividends of 50 and 60 per cent. were quite common. The Japan Steel Tube Company made a net profit of 120 per cent. in 1917. The production of iron and steel during the first and last years of the war affords an interesting indication of the degree to which the iron trades expanded. They are shown in the table below:—

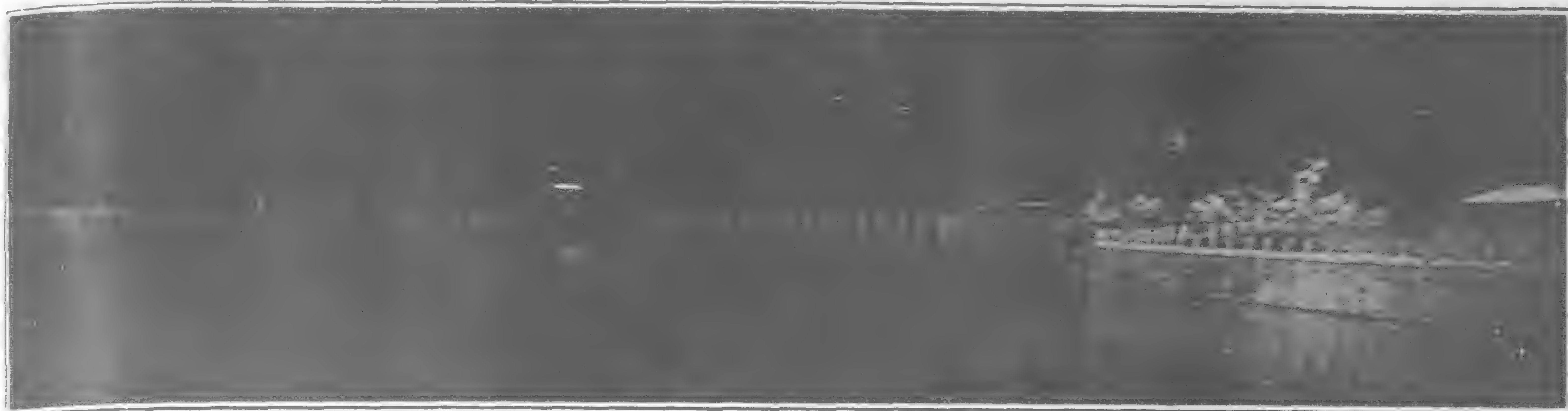
		1914. Tons.	1918. Tons.
Pig iron	...	300,221	671,168
Alloy pig iron	...	1,505	23,670
Total	...	301,726	694,838

At the time of the armistice it is estimated that there were 250 ironworks in Japan in full operation, comprising 54 blast-furnaces, 95 open-hearth furnaces, 17 converters, and 47 crucible furnaces. It is interesting to note how greatly the electric furnace has grown in favor in Japan, as there were in 1918 over 200 of these furnaces at work. The estimated capacity of the iron and steelworks of Japan during this period was 1,200,000 tons of steel per annum. The boom which prevailed during the war and encouraged the expenditure of vast sums of money for the extension of the home industry has been succeeded by a severe slump. The needs of Japan in iron and steel are so considerable that her rulers are disinclined to establish a protective tariff in favor of home production. At the same time it is difficult to see how the native industry can compete with supplies from other countries. At present the United States has enormously increased her exports to Japan. In 1913, for instance, Japan imported about 7,200 tons of steel plates from the United States. In 1919 the imports amounted to 244,000 tons, and while other iron and steel products did not perhaps increase in the same proportion, they were in many instances ten times greater in 1919 than they were in 1913. Japan's imports of metal-working machinery from the United States in 1919 were valued at over £1,250,000.

In Adjacent Territories

A review of Japan's iron and steel industry would be incomplete without some further reference to her undertakings in Chosen, in Manchuria, and in China. In Chosen both the Mitsubishi Company and the Mitsu Company have large interests in iron ore properties, and several works have been established. The former company has built a blast furnace at Kenjiho in North-West Chosen. The most ambitious project controlled by Japan, outside Japan itself, is the Pen-hsi-hul Coal and Iron Company, Limited, whose works are situated 45 miles south-east of Mukden in Manchuria. The plant consists of two blast-furnaces of 150 tons capacity, the coal and ore both being obtained in the locality. The completed project, however, comprises eight blast-furnaces and a steel plant. The first furnace of this plant was blown in in January, 1915, and considerable success has attended the project. Reference has already been made in the body of this article to the Japanese interests involved in the ore mines of the Yangtze province of China and in the Hanyang Works.

Hydro-Electric Plants in Japan



Big Reservoir of the Kinugawa Hydro-Electric Company at Kurobe

WRITING in the *Times Special Japan Supplement*, Professor R. Torikai Professor of Electrical Engineering, Imperial University of Kyoto, says of the present development of hydro-electricity in Japan that 'in size and equipment, and indeed in every way, hydro-electrical works in Japan are not to be compared with those in various countries of Europe and America. Yet the natural features of Japan and the progress which the country has already made in this direction indicate that hydro-electricity has a great future in Japan. Already electricity generated both by water power and from coal is used for lighting purposes and transport and in chemical and other industries. Electric light is in almost universal use in Japan to-day, and even in small villages and in remote places in the heart of the mountains the inhabitants enjoy the benefit of this method of illumination and are no longer compelled to rely on the inconvenient oil lamp. This ubiquitous use of electric power is entirely due to the introduction of hydro-electricity.

The remarkable advance which Japan has made in the use of hydro-electricity is demonstrated by an examination of the generating equipments at present in use, a brief description of which I will now proceed to give.

As I have already pointed out, Japan is essentially a mountainous country. The traveler has not to go far before he can hear the whirring sound of water turbines. The loftiest mountains are situated in the centre of the country, and this district is known as the Japanese Alps. Here and at some of the lakes is to be found the greatest head of water. Fortunately the two great industrial centres—viz., Tokyo and Osaka—are situated not far from adequate water power supplies, and can thus be supplied with electricity economically and with little difficulty. Accordingly the large and typical hydro-electric concerns have naturally utilized these centres of water power and concentrated on the supply of power to these two cities.

In the case of the Ujikawa Electric Company, Lake Biwa is the source of water power, and supplies at the rate of 2,000 cu. ft. per second. The capacity of the power house is about 35,000 kw. at three-phase 11,000 volts and 60 cycles. This is stepped up to 55,000 volts and transmitted to Osaka, which is 20 miles distant, from the power house. At a sub-station near Osaka it is again stepped down to 11,000 volts, and distributed at that voltage over the city by underground cables. This is the usual system of distribution in the large cities, such as Tokyo and Osaka. This company, in conjunction with the Osaka Electric Light Company, which has an output capacity, generated from coal, nearly equal to the former, has been supplying most of the electrical current for

Osaka. At the present time the rapid growth in the needs of this city has outrun the supply capacity of these systems.

Old Methods Discarded

The Ujikawa Electric Company is now building a second power station, and an interesting point about this work is the elimination of long tunnels and canals in the carrying of the water, and the introduction of river dams for raising the water level. The source of the River Uji is Lake Biwa, and its course is nearly parallel to the waterway of the first power station. By building a high dam across the river, and thus raising the level of the water to a height sufficient to generate the necessary power, the company is able to erect the new power house quite close to the old one, and canal excavation is therefore unnecessary. This is the first system on which the new method of damming has been employed. The erection of this new generating station will double the output capacity of the company.

The Ujikawa Electric Company and the Inawashiro Electric Company are the largest concerns in Japan. The latter is a large enterprise, and its rated total output capacity is larger than any other individual concern. The Inawashiro is a volcanic lake in the north of Japan, and is the source of a river which flows down towards the Wakamatsu Plains. Although the distance between the lake and the plain is very short, yet the difference in level between these two points exceeds 1,000-ft. To utilize the potentialities of this site the company plans to build a series of four large power houses, two of which have already been erected and supply electricity to Tokyo.

Capacity of Conductor Line

Two other power stations will be constructed in the near future. The second station has recently been erected, but I have not yet had an opportunity of seeing it. I understand that there is very little difference between it and the first station, which I shall briefly describe, as it indicates the extent of the company's capacities. Its generating capacity is about 40,000 kw. at 11,000 volts and 50 cycles. The voltage is stepped up by transformers and transmitted to Tokyo at 110,000 volts for a distance of 150 miles. The electrostatic capacity of the conductor line is so great that the charging current exceeds the capacity of each generator. The line consists of copper conductors and steel towers, nine suspension insulators being used. The voltage used in transmission is the highest in Japan, and the transmission line is also the longest so far constructed there.

These two companies, which I have described, can be taken as representing hydro-electric establishments in the western and eastern districts of Japan respectively. Hydro-electricity is also supplied by many other firms, and below are given the names of those possessing power capacities of over 10,000 k.w.

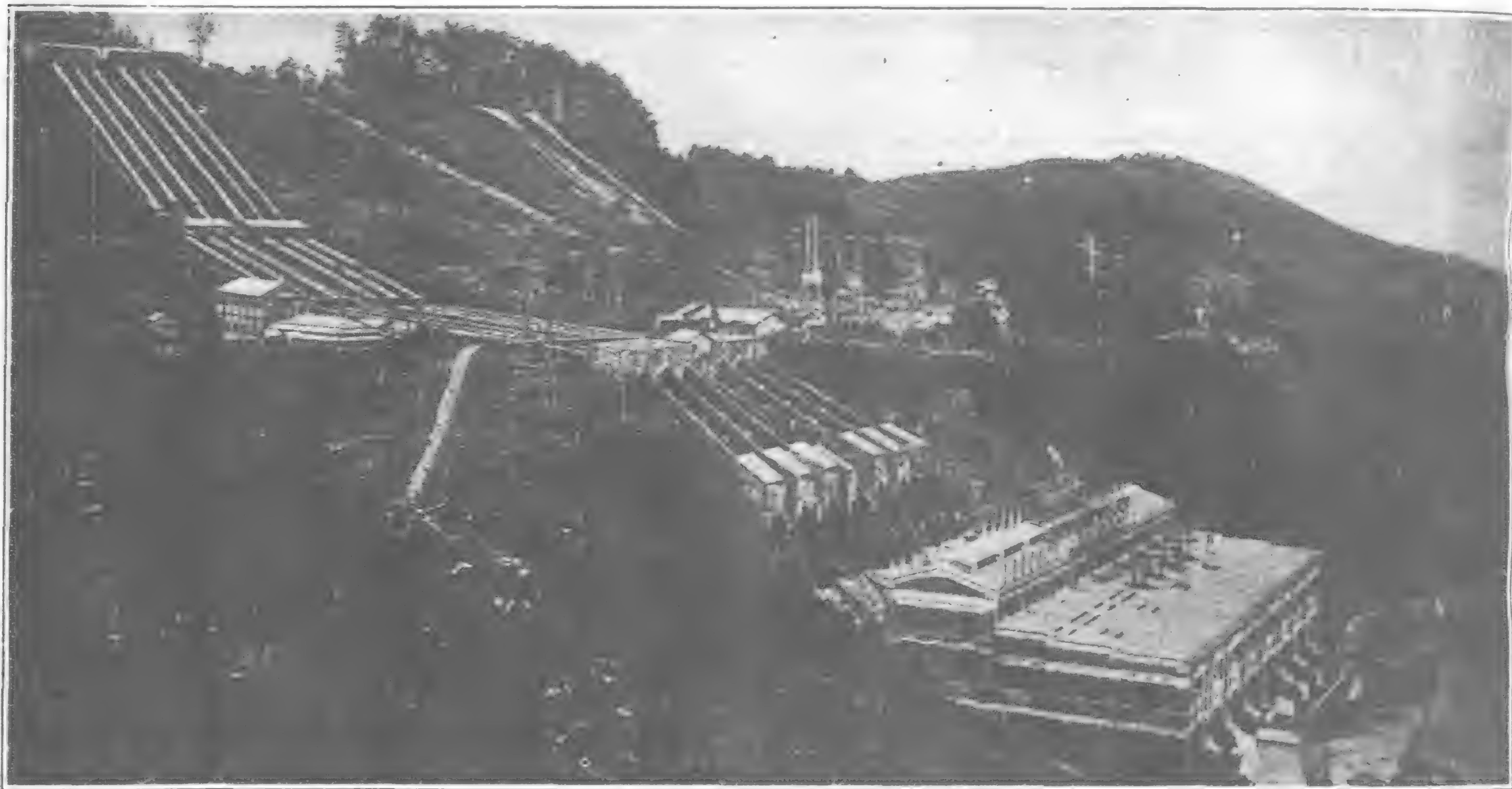
Komahashi Generating Station (Tokyo Electric Light Company).
Katsuragawa Electric Power Company.
Kinugawa Hydraulic Power Company.
Kiso Seitetsu Company.
Kiushiu Hydro Electric Company.

The transmission lines of most of these companies are over 50 miles long at a voltage of 55,000 or 66,000. All the companies already referred to, indeed all the power stations throughout the group of islands comprising Japan, are now working at full load, and have no surplus power to meet the increasing and unlimited demand for electricity. To supply this need many very large hydro-electric generating systems, dependent upon the water power resources of the "Alps," have been planned, and in some cases construction

district centring around Tokyo the frequency of the alternating current is 50 cycles, while in the western districts centring around Osaka, the selected standard is 60 cycles. As the result of this discrepancy it is impossible to connect these two industrial cities by the one transmission line, and the two sets of generating stations cannot supplement each other, as, for example, in case of accidents. The truth is that 30 years ago no one foresaw the possibility of connecting Tokyo and Osaka, separated as they are by some 400 miles of country, and again it must be remembered that the development of electrical engineering has been on revolutionary lines. In order to eradicate this defect it is necessary that some kind of frequency-changing apparatus should be installed.

Extent of New Schemes

Some of the new schemes to which I have referred provide for transmission lines extending over 200 miles, and voltages of 165,000 have been decided upon. The construction of the electrical equip-



The Inawashiro Hydro-Electric Generating Station and Pipe Lines

work has already begun. Among these new schemes are the following:—

FOR THE SUPPLY OF ELECTRICITY TO TOKYO

Hakusan Hydraulic Power Company.
Shinetsu Hydro Electric Company.
Tenryugawa Electric Company.
Gumma Electric Company.

FOR THE SUPPLY OF ELECTRICITY TO OSAKA

Nippon Electric Power Company.
Nippon Hydraulic Power Company.

All these projects provide for a very large output. The Gumma Electric Company will have a capacity of 60,000 k.w., the Shinetsu Company 170,000 k.w., the Nippon Electric Company 300,000 k.w., and the Nippon Hydraulic Company 300,000 k.w. Anyone who is unacquainted with the present demand for electricity in Japan might conclude that the construction of these systems will lead to an over-supply of electricity, but the present shortage and the anticipated increase in demand resulting from industrial developments and the substitution of electric for steam drive due to the high price of coal definitely point to the country's ability to consume all the electricity which will be generated.

It is unfortunate that one technical error has been committed in the development of hydro-electricity in Japan. In the eastern

ment necessary to supply 300,000 k.w. and transmit it over 200 miles at a voltage of 165,000 will naturally be beset with difficulties but the results and experience obtained will prove both interesting and valuable, and if Japanese electrical engineers as a result are able in any way to contribute to the science of electrical engineering they will feel amply rewarded.

There are other questions connected with the utilization of electricity in Japan, for example, the problem of railway electrification and the organization of supplies of electric power. At the present time all the tramcars and inter-urban lines in Japan are run by electricity, but the mountainous nature of the country presents obstacles to the development of steam railways. With a view to increasing the traffic capacity and providing additional services the railway board, by whom the nationalized railways of Japan are managed, has made plans for electrifying all the railways and these proposals are at present before parliament. The needs of the present transport situation demand that the railways should be electrified as far as possible. In connection with this project and as a preliminary step the board intends to install an extensive system of electrical equipment and this will be a decided contribution to the progress, consolidation, and unification of the electrical industry in Japan.

The Philippine Railway, 1920

OPERATING REVENUES.—Total operating revenues for the year ending December 31st, 1920 exceeded those of the previous year by \$144,290, or 24 per cent.; freight earnings increased \$18,383; passenger earnings \$115,549; transportation earnings from other sources \$1,695, and incidental revenues \$8,663. The increase in revenues is accounted for by the exceptionally good passenger business on both divisions, increased freight traffic on Panay and a raise of 7.7 per cent. in freight rates, and 8.3 per cent. in passenger rates, effective September 1st, 1920. In the past four years increases of 30 per cent. in passenger rates and 40 per cent. in freight rates were secured.



Cebu Office and Station Building, Philippine Railway Co.

OPERATING EXPENSES.—Total operating expenses for 1920 amounted to \$531,500 as compared to \$396,700 for the previous year. Before the increase in prices brought on by the war expenses amounted to about \$250,000 a year. Expenses for the year 1920 have increased 115 per cent. as compared with the year 1916, freight tonnage increased 34 per cent. and passengers carried 59 per cent. Gross revenue increased 92 per cent.

BOND INTEREST.—The interest on the outstanding 4 per cent. first mortgage bonds of the Company amounted for the year to \$341,960.00; of this amount, the Company was able to provide from earnings, after appropriating \$43,223.88 for addition and betterments, \$170,873.71, or 50 per cent., and the Philippine government, in accordance with the contract of guaranty, advanced the balance, or \$171,086.29. The total of advances made by the government to December 31st, 1920, to meet interest bonds is \$2,888,047.86.

EQUIPMENT.—Equipment purchased during the year was largely confined to shop machinery, the following additions being made:—

Setting up Foundry, Cebu ...	\$ 849.20
One Engine Lathe for Cebu ...	721.42
Universal Monitor, Cebu ...	1,844.74
Ryerson Hartz Flue Welding, Cebu ...	1,077.41
Morris Plain Radical Drill, Cebu ...	1,603.21
Bolt Threader, Cebu ...	565.34
Leblond Lathe, Cebu ...	1,548.07
Installing New Machinery, Cebu ...	422.88
Saw Mill, Panay ...	1,149.12
Saw Sharpener, Panay ...	178.67
Drilling Machine, Panay ...	536.48
Rivet Heating Furnace, Panay ...	240.67
Electric Light Plant, Panay ...	1,356.61
	12,093.82

LIGHTERS AND LAUNCHES.—

Lighter <i>Francisca</i> , Cebu ...	\$ 3,881.16
Lighter <i>Cuckoo</i> , Panay ...	3,555.66
Lighter <i>Sapian</i> , Panay ...	4,000.00
Launch <i>Nena</i> , Panay ...	5,173.08
Launch <i>Carmencita</i> , Panay ...	10,999.83
	\$27,609.73

ROLLING STOCK.—Locomotives, 15; passenger cars, 52; freight cars, 191; construction cars, 6.

The Yellow River Bridge Tenders

Peking Inaugurates Unusual Opening Ceremony

SOMEWHERE else in this issue, on page 425 to be exact, there is a news item in regard to the Yellow River Bridge, which, since its insertion, must be supplemented with the information that the opening of all tenders received took place in Peking on Saturday, the 2nd of July. The days of tender opening in the presence of purchaser and prospective seller only seems to have passed for at the ceremony which took place at the Yellow River Bridge commission building on the second of July there were present the five judges of the commission and a large body of Chinese and foreign engineers. The event is generally recognized in Peking to be one of the most important in connection with the history of engineering in China. Nine nations were represented in the competition which indicates something of the international interest aroused. The spirit of scrupulous fairness and complete co-operation which was shown by the members of the commission created a very favorable impression. The *Peking Leader* reports on the proceedings as follows: "Twenty-two bids in all were submitted, Chinese, American, British, French, Italian, Belgian, Japanese, Austrian and German firms being among those who entered the competition. Of these twenty-two, four were thrown out because the data required in the instructions was not all on hand. One set of the blue prints, photographs, pamphlets, etc., submitted by each competitor was signed by the chairman of the commission, the representative of the ministry of communications and the senior judge. After the completion of these preliminaries, the plans were turned over to the judges for their consideration. The quality of the proposed bridge and the economy in construction will be the determining factors in the decision. It is understood that the deliberations on the plans will be open to the public.

"The highest estimate of cost was Tls. 23,078,000. When this figure was announced there were exclamations of astonishment. The lowest quotations was \$5,200,000. The majority of the bids ranged between Tls. 8,000,000 and \$9,000,000.

"Considerable regret was expressed that, through delays in the cables and mails, the estimate of costs was not on hand to complete the documents of the bid submitted by John R. Freeman of America. Mr. Freeman's plans included, in addition to the bridge proper, a scheme for controlling the Yellow River.

"It is not definitely announced when the judges will render their decision. All of the plans submitted include many drawings: some are very complicated. Consequently considerable time will be necessary to study them carefully."

FAR EASTERN IRON AND STEEL

THE HSIANGPISHAN IRON MINES.—Reports have reached the united association of the Hupeh people (this association has been organized by the people of Hupeh on account of the mutinies) that at the investigation of General Wang Chan-yuan, the ministry of agriculture and commerce in the capital, has just sanctioned the purchase of the famous Hsiangpishan iron mines from the provincial government of Hupeh by the Sino-Japanese Han-yeh-ping coal and iron corporation of Hanyang.

This means the Japanese interests in central Yangtze have secured another valuable iron property in addition to the iron mines of Tayeh and the coal mines of Pingshiang and it is believed that under efficient modern administration, the output of the Hsiangpishan iron mine will equal to that of the Tayeh product in the course of a few years.

It is true that under Chinese official control, the Hsiangpishan iron mines cannot be worked on a profitable commercial basis; but the people of Hupeh strongly protest to the sale or mortgage of this valuable iron mine to the Japanese or any other foreigners because they want to work it with Chinese capital on a strictly commercial basis with the co-operation and assistance of modern technical advice from western countries.

The members of the provincial assembly in Wuchang have already wired to the Peking government refusing to recognize the deal on the ground that the iron mines of Hsiangpishan are the property of the Hupeh people and do not belong to the Peking government. Owing to opposition, the chief director, Mr. Ho Pei-yun, formerly chief administrator of Hupeh, of the mining bureau, has resigned his post.

* * *

TAYEH IRON WORKS EXEMPT FROM TAXES.—The government has notified the provincial governments to the effect that the Tayeh Iron Works has been exempted from export tax on iron and steel and also for a period of five years from provincial likin and other duties.

* * *

IT is rumored that the Japanese government steelworks, which announced a reduction in price in January, must again lower prices to meet foreign competition. An alternative would be the passage of a bill now introduced into the Diet which will increase the working capital of the ironworks. In the last temporary Diet the exchequer bonds for the use of the government foundry were increased from Yen 20,000,000 to 60,000,000. In a cabinet conference on February 22 it was decided to introduce a bill into the present Diet to increase the floating funds of the foundry from Yen 60,000,000 to 95,000,000.

* * *

A JOINT-STOCK COMPANY has been formed in Chungking for the establishment of an iron foundry. The project is to cost about \$2,000,000.

* * *

AKI SHOJI COMPANY; organized with a capital of Yen 200,000, quarter paid up, to engage in the sale of iron, pig iron and steel. Office, 16 Nichome, Imabashi, Higashi-ku, Osaka. Manager, M. Osaki.

* * *

IRON DEPOSIT FOUND IN JOHORE.—Mr. K. Ishiwara, resident of Singapore, had recently located an iron deposit in Johore, in the Straits Settlements, and has obtained a mining concession from the Johore government. He has organized a company with Mr. K. Matsukata and some other capitalists and has contracted with the Japanese Government Steel Works, at Edamitsu, to sell his supply of iron. The deposit is estimated to contain 10,000,000 tons of iron ore.

* * *

A GREAT STEEL DISCOVERY.—A French engineer, M. Basset, is reported to have solved the problem of producing steel direct from iron ore instead of first making cast-iron for subsequent conversion into steel.

This announcement is made by Charles Nordmann, the French scientist and writing on scientist questions. If this becomes an accomplished fact, France, which heretofore has always been handicapped owing to the lack of coal and of coke, which is necessary for metallurgical operations, will be able to turn out all the steel she needs without having recourse to England or to the United States.

To-day France possesses immense beds of iron ore in Lorraine, and produces without difficulty some 10 to 15 million tons of iron ore annually for conversion into steel.

But if France does possess rich iron deposits her steel manufacturers are obliged to import coal from abroad, as that produced in France is not suitable for her blast furnaces.

M. Basset's process is the injection of hot air and coal dust into the furnaces, which permits of reducing the cast iron to a state of fusion in one-sixth of the time at present required.

Experiments on the Basset process are now being carried out, and, according to Professor Nordmann, if successful, will revolutionize the steel industry and will prove particularly profitable to France.

* * *

THE NINIWA IRON WORKS was organized recently at 478 Teunajimura, Tosei-gun, Osaka. Manager, Mr. T. Morikana.

* * *

IRON FOUNDRY ON SHINWA ISLAND, CHINA.—An Anglo-Chinese-Japanese syndicate has been formed with a capital of Y.15,000,000 to establish a huge iron foundry on Shinwa Island, China, where 200 tons of pig iron will be produced per day.

* * *

PRODUCTIONS OF DAHYEN IRON FOUNDRY EXEMPTED.—

While the proposal to establish an iron foundry at Dahyen to be placed under the control of Hanyang Iron Works was approved in the Ching Dynasty, the construction of the foundry actually commenced in 1913. Now, the authorities of the iron foundry, which has been nearly completed, requests the ministry of finance to exempt their production from export duty, likin charges and all other taxes for five years from date of inauguration on the ground that most of their products will be exported; the latter has duly sanctioned their request.

* * *

TANAKA IRON WORKS, LTD. organized with a capital of Yen 100,000, one-half paid up, to manufacture machinery and boilers, etc. Office, 233 Sawakamie-cho, Kita-ku, Osaka. Manager, Y. Naito.

* * *

AMERICAN STEEL MANUFACTURERS OUTBID.—Public tenders were asked for by the New Zealand government for 22,500 long tons of steel rails and fishplates, with the result that 10,000 tons were placed with a British firm at £17 0s. 5d. c.i.f. per long ton for steel rails and £21 1s. 8d. per long ton for fishplates. The American bid was £18 gold c.i.f. per long ton for rails and £21 for fishplates.

* * *

JAPAN'S IRON STOCKS.—In view of the fact that there are large stocks of iron in Japan, it is reported that no more iron will be imported from abroad for the rest of the current year.

Last year witnessed a remarkable decrease in the production of iron throughout the world. For instance, England produced pig iron to the amount of 16,260,000 tons before the outbreak of the great European war that is, in 1913, but its production in 1920 totalled only 8 million tons. America is the only exception with an increase of six million tons. For these details are as follows:—

PIG IRON AND STEEL.
(In thousands of tons)

	1913	1920	1913	1920
America	309,66	364,03	310,01	407,73
England	162,60	80,08	76,04	90,51
Germany	190,08	70,00	186,48	90,00
France	51,26	32,65	46,20	29,15
Belgium	24,45	11,13	24,28	12,16

During last year, this country imported 995,195 tons of pig iron inclusive of rails and tubes; while the year before last, the imports of pig iron amounted to 661,159 tons. On the other hand, the production of iron amounted to 300,000 tons from the Government Iron Works in Yawata in Kyushu alone. It is true that one-half of the production, that is, 150,000 tons, was placed on the market, the other half being used by the railway department, the home office, and the other government offices. In consequence, the iron market in Japan is subject to fluctuations, being affected by foreign influences.

However, the Government Iron Works has now 196,225 tons on hand awaiting disposal; while other iron manufacturers have large stocks of iron, the supply evidently exceeding the demand. Such being the case, it is generally thought that no further attempts will be made to import iron from abroad, because it will precipitate another slump in the iron market in Japan.

Engineering, Financial, Industrial and Commercial News

AGRICULTURAL

New Enterprise at Soochow.—An agriculture and pastoral company capitalized at \$300,000 is being organized at Soochow, Kiangsu, by the local influential personages, Mr. W. S. Woo and several others. This is a new enterprise of its kind in an inland city, and it will be opened as soon as the registration with the industrial commissioner of Kiangsu has been sanctioned.

AUTOS

The Nisshin Automobile Co., Ltd., Japan.—Established with a capital of Y.500,000, quarter paid-up, to manufacture cars and attachment. Office, 232 Shichome, Sone-zakikami-cho, Kita-ku, Osaka. Mr. K. Imanishi is managing director.

Omnibus Service, West Java.—A company has been formed to operate an omnibus service in West Java under the name of "Omnibusdienst West Java." While this is not the first omnibus company to be operated in the Dutch East Indies, it is of interest that it is to operate in West Java, as the motor bus is not now in use in that part of the island. There is an opportunity for a large development in this thickly populated island, and it is reasonable to expect that other companies will be organized in other districts.

New Auto-Bus Line, Japan.—The Biyedo Automobile Company, of Fujisawa-machi near Yeno-shima has been granted permission to operate a public auto-bus line between Fusamachi and Yoda.

Yokohama-Kamakura Motor Bus Line.—Permission has been granted to Mr. K. Mori to operate a motor bus service between Yokohama and Kamakura charging a fee of Y.1.50 for passage one way.

Yangtze Machinery Works Manufactures Automobiles.—The Yangtze Machinery Works, established at Chanchiachi, below Hankow, some dozen years ago, is rapidly growing an important institution in the manufacturing circles of Hankow and Wuchang. It is now understood that a Cantonese engineer of the establishment has succeeded in turning out an automobile quite comparable to machines manufactured in America and European countries. The works will shortly enter into the business of making cars after the inventor's pattern on a large scale, according to a recent advice from Harkow.

The Maruwa Industrial Co. was organized recently to do a business in automobiles. Office at 2440 Kameyedo-machi, Takyo-fu. Representative: Mr. D. Takeda.

AVIATION

The Tokyo-Changchun Test Flight.—Four Japanese planes will participate in the experimental flight from Tokyo to Changchun. The machines are of Japanese make and will start from Japan across Korea, thence to Fengtien and finally to Changchun whence they will return by steamer to Japan. The flight is postponed indefinitely.

Aircraft Factories, Japan.—The Mitsubishi Company and the Kawasaki Dockyard Company have decided to enter the aircraft business, and several English engineers engaged by the former company have arrived in Japan to supervise the

factory being erected at Kagamiga-hara. The Kawasaki Dock Company have purchased 50,000 *tsubo* of land at Inaba-gun, Gifu prefecture, near Kagamiga-hara for the erection of a similar plant.

Seaplanes on Upper Yangtze.—A scheme is being launched to start a seaplane service between Ichang and Szechuan ports.

Funds for New Work: China.—General Ting-Chin, chief of the aviation bureau, is working for a revival of the aerial loan question which was pigeon-holed, in view of the difficulty of securing funds. He is said to be anxious to obtain a sum of two million dollars on the security of the aerial route between Peking and Shanghai.

BUILDINGS

A New Museum.—A donation of one million yen for the construction of an art museum in Tokyo, has been made by Mr. Keitaro Sato of Fukuoka prefecture, Kyushu.

New Railway Hospitals, Japan.—Two new railway hospitals will be built, one at Sendai and the other at Nagoya, at a cost of Y.410,000.

Reformatory for Korea.—The government general of Korea has decided to establish a reformatory for juvenile prisoners in Kaijo, Koiki province. It is to cost \$250,000 and will be ready in March, 1922. The building will house 500 persons.

Erections for Customs at Swatow.—Late last year an American firm began work on a large construction contract for the maritime customs. Under construction are the examination shed, administrative building, and 14 residences for staff at a cost of about Tls. 280,000. This represents only about one-half of the work planned, the contract for the remainder having recently been obtained by the same firm. The buildings are being made of reinforced concrete. It is possible that the advantage of such construction in this region, where white ants abound and do much destruction to timber and which is occasionally visited by earthquakes, will be appreciated by the Chinese and be adopted for the better class of buildings. Several foreign-owned buildings have recently been built of reinforced concrete. Native construction is hopelessly faulty as the 1918 earthquake proved.

British Consular Buildings in China.—The house of commons has agreed to a vote of £53,515 on the acquisition of a site for the erection of a new consular building at Tientsin, and £27,000 for the erection of a new consulate and residence at Harbin.

A Girls' School at Yokosuka.—On a site recently purchased for Y.50,000 a girls art school will be constructed at Yokosuka city.

A Commercial School.—Y.130,000 have so far been subscribed for the establishment of the Yokohama Higher Commercial School.

Proposal to Build Governmental Buildings.—The beauty of the Tokyo imperial palace will be greatly damaged by the loss of the moat outside the moss-grown rampart from Wakakura gate to Sakurada gate and the construction there of imposing buildings for the government offices, planned by Doctor Okuma, technical engineer of the temporary officer of the construction of the new Diet

building, reports the *Chugai Shyogo*. According to the loan proposed by the doctor the moat will be filled up for the central seat of the government offices, the city office of Tokyo and the meeting hall for citizens in Tokyo.

The paper says that the proposal has already been approved by the city planning bureau of the home department, the only objection being raised by the department of imperial household on the superstitious grounds that the moat in question is situated in the direction of "Snake and Dragon" (Southeast) of the palace. It is estimated that the plan will be completed within 10 years.

Modern Railway Hotels, China.—Another improvement in railway affairs can be recorded by the decision of the Chiaotung Pu to establish modern railway hotels, on lines similar to the Yamato Hotels on the south Manchuria railway, on several Chinese lines. On the Peking-Mukden Railway these hotels will be opened at Tientsin, Tongshan, Peitaiho and Shanhaikuan; on the Peking-Suiyuan line at Nankow, Kalgan, Tatung-fu and Suiyuan; on the Peking-Hankow line at Hsiling, Chikungshan and some other stations that have not yet been selected; on the Tientsin-Pukow line at Tsinaifu, Taian, Chufu and two other stations yet to be chosen; and on the Shanghai-Nanking-Ningpo railway at Nanking West and Ningpo.

T. K. K. As Hotel Proprietors.—It is reported from Tokyo that the Toyo Kisen Kaisha contemplates spending no less than Y.20,000,000 on the construction of hotels—one at Tokyo and one at Yokohama, while the Oriental Hotel at Kobe, which is owned by the T.K.K. will probably have two or three stories added.

A Central Railway Station, Peking.—It has been decided to put into operation the plan for the construction of a central railway station near the Temple of Agriculture and the chief engineer of the Peking-Hankow Railway has been instructed to carry out the survey. The cost of construction is estimated at \$3,000,000.—*Reuter*.

BRIDGES

The Yellow River Bridge.—The government has been advised by Minister Wei Chen-tsu from Brussels to the effect that the Belgian engineer who has been engaged for the Yellow River Bridge commission of the Peking-Hankow Railway cannot arrive in China in time within June, so that he suggests that the date for the opening of the tenders for the reconstruction of the said bridge should be postponed to the 31st July, 1921. This suggestion is under the consideration of the ministry of communications. It is reported that at the request of the Japanese legation, a Japanese railway engineer will be appointed to the Yellow River Bridge commission of Anglo-French-Belgian-Chinese engineers by the Chinese government.

New Bridge, Japan.—The famous Seto-noi karahasi bridge crossing Lake Biwa near Kyoto is to be rebuilt at an estimated cost of Yen 420,000. Temporary work was commenced in April.

Bridge Reconstruction, Japan.—The Sagami bridge in Kanagawa prefecture will be recon-

structed under contract by Mr. Namba and the Sakai bridge in the same prefecture by Mr. S. Kajima.

New Bridge Planned, Bangkok.—The project to link up the northern and southern state railways of Siam is receiving very favorable consideration, and will involve the construction of a bridge over the river at Bangkok, which at that point is about 50 feet deep and 800 feet broad.

Canton Planning Bridge Construction.—The provincial assembly of Kwangtung propose constructing a bridge between Canton city and Honam (opposite to Canton on the opposite bank of the river).

Sydney, Australia, to Invite Tenders for North Shore Bridge.—The engineering department of the Metropolitan Railway Construction is preparing plans and specifications for the Sydney (Australia) Harbor North Shore Bridge, which is to form an integral link in the loop system of electric railways running into and around the city and will also provide for vehicular and pedestrian traffic. The cost of the bridge at pre-war prices would have been in the neighborhood of £2,500,000 to £3,000,000. It was proposed to add somewhat more than half of the cost of the bridge to the capital cost of the railways, the balance to be charged against the city of Sydney and the municipalities and shires on the northern side of the harbor, to be liquidated by a tax on the unimproved capital value of these areas. It was hoped that parliament would pass the necessary enabling act so that a worldwide call for tenders on these specifications might be issued about October, 1921, the tenders to be returnable a year later, thus giving about 12 months for contracting firms to prepare their bids.

COMMERCIAL

New Merchant House, Japan.—The Toyo Trading Company was organized recently to conduct a business in oils and machinery. The capital of the firm is Y.50,000 and their office is at 17 Hackikau-cho, Kyobashi-ku, Tokyo. Mr. I. Imanishi is the manager.

A General Merchant Business, Japan.—To sell machines, general hardware and other things the firm Fujita & Co. has established itself at 3 Shichome, Matosuki, Ya-cho, Kyobashi-ku, Tokyo, with Mr. T. Fujita as representative.

Importers of Machinery, Japan.—The firm Asanuma & Co. established itself recently at 3 Gochome, Kabiki-cho, Kyobashi-ku, Tokyo, with Mr. K. Asanuma as representative to import construction material, machines and tools, and copper and steel.

Dealers in Explosives, Japan.—The Dainihon Juho (Gun) Company Ltd. was organized recently to sell powder, guns and cartridges. Their office is at 19 Nakasarugaku-cho, Kanda-ku, Tokyo, under the management of Mr. Y. Sotome.

The Kado Information Co.—Established at 13 Nichome, Kobiki-cho, Kyabashi-ku, Tokyo. Manager: Mr. K. Shimada does a general printing and advertising business.

The Chugai Lumber Co. was organized recently with a capital of Y.250,000 at 5 Itchome, Uchisai-wai-cho, Kajimachi-ku, Tokyo, with Mr. K. Ogimachi as manager to do business in lumber.

Sankyo & Company.—Organized for export and import of Chinese products. Office, 5431 Shinpoin-cho, Tennoji, Osaka. Manager: Y. Maeda.

Beet Sugar in North China.—M. Y. San, who plans to erect soon a million dollar sugar refinery, is starting a movement for the cultivation of sugar beets in North China. Recent investigations have proved that the crop offers large possibilities and Mr. San has employed two Chin-

ese experts to write literature dealing with the raising of the product. Selected beet seeds are being distributed from the M. Y. San store on Nanking Road, Shanghai.—*Millard's Review.*

A New Sino-American Trading Company.—The Far East Trading Company Inc., incorporated under the laws of the United States in force in China and capitalized at Shanghai Tls. 200,000, will be located in the "Fetco" building, 62 Kiangse Road, and branch offices will be opened in San Francisco, New York, London and Paris.

The incorporators and officers of the company are: F. G. Boulon, president; H. L. Ford, vice-president, and H. D. Rodger, secretary and treasurer.

Several prominent and influential Chinese merchants have associated themselves with this new company, the most important being Mr. Shen Ling-fong, chairman of the Chinese Silk Guild, and Mr. Choa Erh-kung, general manager of the Yung Chong Match Factories.

The Nitto Belt Manufacturing Co. was organized recently to manufacture machinery belts. Office: 340 Nichome, Kamifukushima, Osaka. Manager: Mr. U. Shimada.

The Hasegawa Shoten Company was organized recently to do a general import business. Office: 5 Nichome, Kitahoriye, Nishi-ku, Osaka. Manager: Mr. T. Hasegawa.

The Asahi Printing Company, Ltd. was organized recently with a capital of Y.200,000, quarter paid up. Office: 6 Gochome Yedobori, Nishi-ku, Osaka. Manager: Mr. R. Kumagaya.

The Kishimoto Shokai Company was organized recently to sell machinery. Office: 933 Taikai-cho, Nishimoda, Osaka. Manager: Mr. K. Yoshizawa.

The Yamada Shoten Co. was organized recently to sell construction apparatus. Office: 1 Nichome Mitoroshiro-cho, Kanda-ku, Tokyo. Representative: Mr. I. Jujii.

DEVELOPMENT

New Medical Laboratory at Tokyo.—The first medical laboratory ever established in Japan for the combined purpose of theoretical and clinical research will be built close by the famous Sato Juntendo Hospital at Ochanomizu, Hongo, under the name of the Juntendo Medical Laboratory.

The building will be two-storied, and constructed of reinforced concrete, covering an area of some 300 *tsubo*. The work will be completed within this month at a cost of Y.300,000, internal equipment will not be ready for use before twelve months.

Bunding, Road and Tramways for Swatow.—During last year the local government instituted a bunding and foreshore reclamation project at Swatow. A bunding bureau was created for carrying out the work. Surveys and plans were made by Japanese experts and recently a Cantonese firm procured the contract for the construction of the bund and for the reclamation work, involving, it is claimed, an expenditure of over \$2,000,000. An 80-foot road along the bund is to be built and a tramway is projected. If the undertaking is properly carried out it will prove a great boon to the port.

New Development Project, Korea.—Hon. K. Hayashida and others have purchased land in the vicinity of Rashin, Kankyo north province, to the extent of 8,000,000 *tsubo*, and will organize a land company for its development.

Reclamation Work, Japan.—20,000 *tsubo* of ground will be reclaimed at Tauramachi, Miura-gun, Kanagawa prefecture.

Big Chinese Corporation is Organized.—A new Chinese corporation, the Fung Sheng Industrial and Commercial Development Corporation, will open for business at 35 Szechuen Road next to the Han Yeh Ping Co. Building, Shanghai.

The new corporation is capitalized at \$2,000,000 more than half of which have been already paid up, represents the entry, on a substantial scale, of leading Chinese financiers into modern lines of business hitherto neglected by them, and its inauguration at this period of business depression reflects the confidence of these men in the future prospects of trade.

The promoters and shareholders represent leading business men and capitalists in this country. Chin Yung-peng, the premier; Pan-fu, the vice-minister of finance; Sun Pao-chi, director of the inspectorate-general of customs; Lu Yung-hsiang, the tuchun of Chekiang; Fu Siao-en, managing-director of the China Merchants' Steamship Navigation Company; Shen Lien-fang, chairman of Steam Filatures and Cocoon Merchants' Guild; Sui Meng-ken, managing-director of the Peking-Suiyuan Railway; James H. Lee, Dr. Z. T. K. Woo, general superintendent of the Hanyang Works; and E. Y. Edward Sheng are among the chief shareholders.

The original aim of the promoters was to organize a firm, with shares of no par value technically equipped to undertake the development and management of the vast real estate holdings, industrial plants, mines, and stocks and bonds under their ownership or immediate control.

Later, with the infusion of other business men and realizing the opportunity of a general company to undertake construction, stocks and bonds, real estate mortgages, insurance, storage warehousing and industrial financing business, they threw open the subscription to a large public and made it into a limited joint stock company controlled by a group of purely business men. Besides the personal support of the shareholders, the corporation is closely affiliated with a group of strong banks, capable of taking care of any large project it may undertake.

The moving spirit of the enterprise is the managing-director of the concern, Mr. E. Y. Edward Sheng. Mr. Sheng, who is the oldest son of the late Sheng Kung-pao, is concurrently the assistant general manager of the Han Yeh Ping Iron and Coal Co., Ltd., president of the Commercial Bank of China, president of the Wah Foo Commercial and Savings Bank, superintendent of the Chinese American Bank of Commerce, and is on the directorate of many other large business enterprises.

Mr. Y. S. K. Su, one of the assistant managers, is a son of Tuchun Lu Yung-hsiang.

The other assistant manager, Mr. James H. Lee, vice-president of the Wah Foo Commercial and Savings Bank, and is the president and promoter of a chain of electrical plants in many of the interior cities.

The board of directors of this company consist of Messrs. Chien Nun-shun, Y. S. K. Liu Pan-fu, Yao Moo-lien, Shen Lien-fong, Sui Meng-kun, Fu Siao-en, James H. Lee and E. Y. Edward Sheng.

A New Tokyo Planned.—It is reported that Baron Goto, mayor of Tokyo, will begin a series of public lectures the latter part of this month in support of his plan which he has outlined for municipal administrative reform and for the building of a greater Tokyo.

According to the plan which he has just made public he has outlined a program which will take 15 years to complete and will require an expenditure of Y.800,000,000. Under his plan he would reconstruct all the streets of Tokyo and install a complete sewage system and carry out many other drastic changes which are essential to the improvement of the city. The expenditure involved is so enormous that to realize the plan the active support of all the citizens of Tokyo is required.

According to the assistants of the mayor he plans to give a series of lectures in each ward explaining his plan and showing the many advantages which are to be had from such a plan. Many prominent men are reported to have agreed to aid in the movement of getting the plan before the public and to give it their support.

The Hua Shen Industrial Co. is being organized by prominent men in Shanghai and Chekiang province with a capital of \$2,000,000 silver, to

Cable Address :
"DOCKYARD" KOBE
"DOCK" DAIREN



A1, A.B.C. (4th and 5th),
Engineering, Scott's, Leiber's
Bentley's
and
Western Union Codes Used

KAWASAKI DOCKYARD CO., LIMITED

CONTRACTORS TO THE IMPERIAL JAPANESE ARMY AND
NAVY AND TO FOREIGN GOVERNMENTS

KOBE

ESTABLISHED 1870

STEEL MAKERS, SHIP-OWNERS, LOCOMO-
TIVE BUILDERS, SHIPBUILDERS,
ENGINEERS AND REPAIRERS

BRANCHES:

DAIREN, N.-C.,
Dockyard & Engineering
Works

HYOGO, KOBE
Steel Foundry, Bar Mill and
Railway Shops

FUKIAI, KOBE
Plate Mill

BUILDERS OF

BATTLESHIPS, CRUISERS, TORPEDO-BOATS, DESTROYERS,
SUBMARINES

ALSO, BUILDERS OF

FIRST-CLASS HIGH-SPEED OCEAN STEAMERS OF THE
LARGEST SIZE AND POWER

conduct agricultural, industrial, commercial, mining and electrical pursuits. Its head office is in Shanghai.

City Planning Commission Formed, Canton.—The municipality has formed a city planning commission under the department of public works for the purpose of studying and preparing a program of city planning for the city of Canton. The commission consists of nine members with the commissioner of public works, Mr. T. K. Chong, as chairman. The other members are the three divisional chiefs and two other engineers of the public works department. Besides there are three foreign engineers invited by the mayor to become honorary members of the commission. This commission is chiefly of a technical nature. The members will meet at such times as to be announced by the chairman and they will hold meetings at the office of the public works department. Mayor Sun Fo has invited Messrs. Paget, Wier and Olivecrona, to be the honorary members of the commission. All those gentlemen are noted foreign engineers in the city. Mr. Olivecrona is the chief engineer of the Kwangtung conservancy works.

Saghalien Improvements.—In the autumn of 1920 the Japanese started making a railroad from Alexandrovsk to Onora to establish communication with Japanese Saghalien. The work is being done by Japanese workmen specially brought from Japan, and the Russians are only employed to attend to horse haulage. In the winter the Russians got remunerative employment in carting stores from Alexandrovsk to Onor. Rikovsk, Timovo, etc.

This summer the Japanese intend to set to work and alter the course of the river Alexandrovka, and after levelling the present course of the river construct on it the future town. As trade with Saghalien is free of duty, many Japanese shops have opened and are dealing chiefly in rice, flour, manufactured goods and other Japanese products, but at the same time Russian trade exists and meets with no opposition on the part of the Japanese authorities. Trading is done exclusively in yen, and no Russian money is in circulation.

Manchu-Mongol Development.—Through Sino-Japanese co-operation, an important organization, which is called the North-Eastern Industrial Development Association, has been formed with its headquarters in Mukden and a capital of twenty million dollars. The object of the Association is to develop natural resources in Manchuria and Mongolia, for instance, the cultivation of rice and wheat, the felling and planting of trees in the Changpei and the Hsian mountains.

The S. M. R. Co.'s Fresh Enterprises.—The sum of Y.12,000,000 has been appropriated by the South Manchuria Railway Company for the new fiscal year as the fresh enterprise funds of the local administration department. Of this amount, Y.2,600,000 is for electricity works, Y.1,300,000 for gas works, Y.3,800,000 for public works, Y.1,000,000 for hospitals and other hygienic works, and Y.2,000,000 for educational purposes.

The construction of the rest of the local hospital buildings on their site above the S.M.R. Co. general offices will be undertaken on a three years' program, and during the current fiscal year, the foundation work will be completed. Hospital buildings will be erected anew also at Wafangtien and Tashihchiao, to be finished to a major extent during this year. Of the public works in project, the chief items are the enlargement of the Antung waterworks, and the extension of the iron pipes for Antung, Fengtien (Mukden), and Changchun.

Tin and Oil Enterprise: N. E. I.—There has been a marked increase lately in the volume of emigration traffic from Hongkong to the Netherlands East Indies, where the extensive exploitation of tin and oil mines, and sugar and coffee plantations has created an unprecedentedly big

demand for Chinese laborers. It has been found necessary for the purposes of recruitment of the coolies there, to come into an arrangement with the local branches of the Java-China-Japan Line, Netherlands East Indies Bank, the Holland-China Trading Company and, as the usual passport regulations have been waived for the benefit of the coolies, no difficulty has been encountered in maintaining a steady flow of emigration traffic to the Dutch colony. The number of emigrants leaving there by the J.C.J.L.'s steamer is over 1,000 every month. The majority of the coolies now proceed to the East coast of Sumatra where laborers are in great demand.

Industrial Developments: China.—In discussing industrial developments in China, Mr. Arnold notes that American machine works, electric, engineering and shipbuilding companies have opened headquarters in Shanghai and are planning to keep trained technical men at the offices. Plans for the Tsinan waterworks project are being made, and when completed the firms which have been interested will be asked to make tenders. The Chinese are reported to be seeking American participation in the development of the island of Hainan. Under date of March 12, Mr. Arnold reports that the Amoy Tinning Co. and the China Canning Co., Amoy, are planning to enlarge their plants with more extensive connections abroad. The Japanese cotton spinning industry at Tsingtao is developing very rapidly, with 50,000 spindles in operation and 200,000 more in view.

Irrigation Project at Foochow.—Consul Hanson is authority for the information that a company called "Farm Improvement and Irrigation Co." has been recently organized at Foochow, with a capital of \$300,000 Mex. (\$177,000 U.S. currency). It is planned to irrigate about 3,000 acres of rice paddy fields, and pumping machinery costing about \$10,000 Mex. has been ordered from an American company. Electricity is to be used to operate the pumps. Fields will be irrigated by the company upon the payment of a charge of \$6 Mex. per acre per year.

New Industrial Enterprises in Burma.—Vice-Consul Thorling believes that it is possible that contracts for supplies may be made available for American bidders by the new Burma Finance and Mining Co. (Ltd.). The directors of this company are prominent Britishers, most of them also directors of the Burma Corporation, which company employs a large number of American engineers and draftsmen at its mines and also procures a considerable amount of supplies for its mining operations from the United States. The Burma Finance and Mining Co. (Ltd.), organized 11 months ago, has done a good deal of exploration work in the northern and southern Shan States and in Lower Burma. Options have been acquired over two promising tin properties that are now being developed and concessions have also been applied for covering other new discoveries. The government of Burma has granted the company four concessions on the Tenasserim River covering some 10,000 acres, in which apparently important deposits of coal occur.

ELECTRICITY

Tiehling Electric Light.—A proposition has been raised among the Chinese to establish an electric light works.

New Electric Supply Works, Japan.—Electrical supplies are to be manufactured by Shoji & Company of 10 Hinode-cho, Shibaura, shiba-ku, Tokyo. Representative: Mr. S. Shoji.

The Maruzen Shokai Company was organized recently to manufacture electrical machines and tools. Office: 14 Nichome, Hama-cho, Nihonbashi-ku, Tokyo. Representative: Mr. I. Yanagisawa.

The Kyokko Electric Company was organized recently at 18 Nakanegishi-machi. Shitaya-ku, Tokyo, with Mr. T. Masuda as representative,

for the purpose of engaging in the electricity business.

A Business in Electrical Supplies, Japan.—Establishing themselves at 18 Nakanegishi-machi, Shitaya-ku, Tokyo, with Mr. T. Masuda as representative, the Kyokko Electric Company will conduct a business in electrical supplies.

New Electrical Dealers, Japan.—As sellers of general electrical apparatus the firm Shoji & Company has been established at 10 Hirode-cho, Shibaura, Shiba-ku, Tokyo, with Mr. S. Shoji as representative.

Electrical Supplies, Japan.—To conduct a general electric business the Fuji Electric Company whose capital is Y.100,000, quarter paid up, has established itself at 3 Ura Sarugaku-cho, Kanda-ku, Tokyo, with Mr. E. Yamakawa as manager.

A Penang Scheme.—An electrical engineer at Penang has evolved a scheme of railless electric traction in order to solve the transport problem. He has submitted the scheme to the municipal commissioners.

The Asahi Electric Industrial Co., Osaka, Japan.—This company was organized recently at Sanchome, Horiye-shita, Nishi-ku, Osaka, to do a general business in electrical apparatus.

Urai Electric Manufacturing Co., Ltd.—Organized with a capital of Yen 500,000, quarter paid up, to manufacture general electrical machines and accessories. Office, 391 Minami Urai, Sagisugun, Nishinari, Osaka. Manager: K. Kishira.

New Hydro-Electric Plant, Japan.—The imperial railway department is planning to construct a great hydro-electric plant at Niigata prefecture using the water power of the Shinano River. The plant will have a capacity of 84,000 kilowatts and will operate a section of 200 miles of line. It is expected to be in operation in 1926.

New Electric Plant, Jagna, P.I.—The Philippine legislature has granted a franchise to the municipality of Jagna, province of Bohol, to install, operate and maintain, etc., an electric light, heat and power system.

New Electric Enterprise, Taiwan.—The Taiwan Electrical and Industrial Co. (Ltd.) was organized in April, 1921, with a paid-up capital of Yen 6,000,000. The company is to supply power from its hydro-electric plant at Giran to the Taiwan Electric Power Co., which has the sole right of power and light distribution in Taiwan. Later it is to undertake the production of cement, lumber, pulp and other commodities to the manufacture of which electricity may readily be applied.

Huge Electric Project, Japan.—Mr. Z. Yasuda, H. Okawa, S. Wakao, and S. Asano are planning to organize a new electric company to be known as the Tokyo Denryoku Company. The capital which was originally set at Yen 50,000,000 is to be raised to Yen 100,000,000. The basis of this new company is the amalgamation of the Kanto Hydro-Electric Company, Capital Yen 17,000,000, managed by the Asano interests, the Abuluma Hydro-Electric Company, capital Yen 10,000,000 and the Yokiwa Hydro-Electric Company, capital Yen 10,000,000.

To Work Plant by Electricity.—It is reported in the iron trade that the Government Steel Works at Yawata is contemplating the plan of electrifying its plants by degrees for the purpose of saving labor and expenses.

New Plant in Philippines.—An act authorizing the municipality of Naga, province of Camarines Sur, to acquire and operate an electric plant within its territory and form a corporation, if necessary, and for other purposes, has been approved.

HIGH POWER

Radio Apparatus

For Long Distance Communication

We are one of the few companies in the world who can supply high power radio equipment.

The Fuller Arc type of continuous wave generators are by far the most satisfactory and economical transmitters in use to-day, where great distances must be reliably carried.

The great chain of arc radio transmitters of the American Navy Department, the great French station at Bordeaux, France highest powered station in the world, and many others are of this type.

Of course we also manufacture medium and low power equipment.

Any transmitting radius from 1 Kilometer to 20,000 Kilometers. From 1 mile to 12,000 miles.

Receivers, detectors and amplifiers for any wave length range, continuous or damped.

Contractors to the United States War and Navy Departments.

WIRELESS IMPROVEMENT CO.

WORKS AND OFFICES

66 York St. Jersey City, N. J., U.S.A.

Cable Address: "WIRIMPROCO," New York

PETROLEUM PRODUCTS COMPANY

of California

G. W. McNEAR, President.

San Francisco, Cal., U. S. A.

All standard Codes used. Cable address: "Petroprod."

Refiners, Manufacturers, Exporters.

Asphaltum
Benzine
Case Oils
Engine Distillate
Diesel Engine Oil
Fuel Oil
Gasoline
Greases



Insecticides
Kerosene
Lubricating Oils
Naphtha Products
Petroleum
Paraffine Wax
Tree Sprays
Wood Preservatives

Additional Foreign Connections Desired.

Your friends at home would appreciate a copy of the "Ports of the Orient" Issue

We will post copies promptly on receipt of your order at \$3 each plus postage. Postage (extra) is as follows:

To China 10½ Mexican cents; to the U. S. A. and Philippine Islands, 10 cents gold; to Europe and Australia, 20 cents gold; to India, Indo-China, Burma, Straits Settlements, Federated Malay States, Bangkok, Siam, Java, 20 cents gold; to Hongkong, Weihaiwei, 19 Mexican cents; to Japan and Korea, 7 Mexican cents.

Address orders to the Circulation Department

THE FAR EASTERN REVIEW

5 Jinkee Road Telephone Central 3473 Shanghai

The North-China Daily News

Brings you into close touch with Chinese Buyers

Because it has the largest circulation of any newspaper printed in English in the Far East.

Because it is the oldest foreign newspaper in the Far East, and has held the confidence of the Chinese for more than sixty years.

For Advice or Information on Things Chinese, Address

The Secretary, North-China Daily News, Shanghai, China

The North-China Herald (weekly)

is made up especially for circulation in the interior of China, where mails are infrequent and postage expensive. It reaches all the Consular, Customs and Postal Officials and foreign residents in the interior.

Electrification of Philippine Railroads.—In regard to the plans of the Manila Railroad Co. for the use of electric motive power on its road, the bulletin of the Philippine government commercial agency in New York states that the electrical power will be developed from the Agno River, in central Luzon, which is believed to possess a potential capacity of from 12,000 to 15,000 horsepower. A thorough topographical survey of the entire water-power site is being undertaken, and early reports of the survey would seem strongly to point to the feasibility of the project.

Electrical Developments in Foochow.—Consul Hanson reports from Foochow that local Chinese are interested in the organization of a hydro-electric plant to develop power from the Min River, with a proposed capital of \$5,000,000, and American participation is invited.

New Electric Works for P. I.—An act granting to Geronimo Lasala and Emigdio Borja a franchise to install, operate, and maintain an electric light, heat, and power system in the municipality of Sorsogon, province of Sorsogon, Philippine Islands, has been approved by the legislature.

A Lighting Project in the F. M. S.—The chief secretary F.M.S. has approved the appointment of the director of public works (chairman), the general manager for railways, the senior warden of mines to constitute a board for the supervision of all schemes for electric lighting and electric supply throughout the Federated Malay States, and for the direction of all investigations in connection with such schemes. Mr. J. C. M. Matthews, electrical engineer, Selangor, is appointed secretary to the board.

Chinese Government Interested in New Electric Light Plants.—Need of electric power in North China and especially in Peking and Tientsin has become so pressing that the government is taking a serious interest in plans to keep pace with the needs.

Formosa Electrical Industry Company.—The company which was organized on May 2, has appointed as managing director, Mr. J. Nagate. Seven other directors were named at the same meeting.

Electrical Enterprise, Japan.—The report of the communications department for February, 1921 says there are 822 electric companies in Japan with an aggregate capital of Yen 1,318,517,861.

INDUSTRIES

Industrial Exposition, Tokyo.—An industrial exposition has been decided upon the Business Men's Society of which Baron Goto is president to take place at Okazaki Park, Kyoto, from July 5th to September 5th.

Spinning Combine, Japan.—The Toka Spinning Mill and the Chuka Woollen Company have recently amalgamated.

New Clock Factory, Japan.—Clock manufacturing is the intention of a group of merchants in Osaka who have subscribed Y.300,000 to form a company for so doing and to purchase the electric clock patent of Mr. Takaya.

Moving Picture Combine, Japan.—Cinematograph production in Japan is to receive impetus by the amalgamation of the Shochiku Kinema Company and the Shochiku Partnership Company with an increased capital of Y.5,000,000.

The Waseda Printing Company opened offices at 362 Tsurumaki-cho, Ushigome, Tokyo, with Mr. T. Ioka as manager.

Zinc Manufacture, Japan.—The Sakuma Zinc Manufacturing Co. has been established at 2635 Terashima Mura, Tokyo-fu, with Mr. M. Sakuma as representative, to conduct a business in zinc.

Construction Material Manufacturers, Japan.—To manufacture asphalt, cement, brick, to cut

lumber and stone, the Nihon Road Construction Material Manufacturing Co. has been formed at 2 Kotohira-cho, Shiba-ku, Tokyo, whose representative is Mr. K. Koide

New Flour Mill at Chaokaidu.—An Anwher merchant, Mr. Kung, has decided to erect a flour mill at Chaokaidu with a capitalization of \$300,000. After the company is organized, registered with the ministry of agriculture and commerce, and accorded to protection by the local magistrate, the work of building and installation of machinery will be begun.

Celluloid Manufacture, Japan.—With the credit for the encouragement of industries, it is announced, the ministry of agriculture and commerce purchased up to the close of the financial year 1920/1921 six new machines in Europe and America, for which purpose the department dispatched an expert to those parts. They include a complete set of celluloid comb manufacturing machines, a complete set of brush manufacturing machines and others.

Industrial Development, Nantungchow.—Nantungchow, advertised as a model city, will this year carry out the installation of an oil mill, paper mill, electricity plant, soap manufactory, road building, long distance telephone, and other industrial enterprise from the proceeds of a fund of two million dollars to be raised by floating \$2,000,000 local public loan bonds at 8 per cent. interest to be redeemed in 16 annual payments commenced from the fourth year from the date of issuance. This plan was proposed by Mr. Chang Chien and his brother and passed by the local self-government association. It is expected that sum can be raised before June 30th, 1921.

Sakata Iron Works.—Organized to conduct a general foundry and machine shops. Office: 986 Itchome, Inari-cho, Minami-ku, Osaka. Manager: T. Sakata.

Kumamoto Paper Mills, Ltd.—Organized with a capital of Y.550,000 to manufacture paper. Office: 29 Nakano-cho, Taihoji-machi, Minami-ku, Osaka. Managing Director: Y. Yano.

Takahashi Dye Manufacturing Co., Ltd.—Organized with a capital of Y.1,300,000, one half paid up, to manufacture dyes and chemicals. Office: 1 Toyosa ki-cho, Nishinari-gun, Osaka. Managing Director: K. Kishi.

Nippon Spindle Manufacturing Co.—Organized to manufacture spindles for spinning machines. Office: 46 Nishikamiden, Urai, Sagisu-cho, Osaka. Manager: Z. Yoneya.

Nagayasu Shoten Company, Ltd.—Organized with a capital of Y.200,000 for the sale of machinery and tools. Office: 17 Sanchome Kitadori, Takeuri-bori, Nishi-ku, Osaka. Manager: S. Nagata.

Sakai Brick Company.—Organized for the manufacture and sale of bricks and construction materials. Office: Tojo-mura, Minami, Kawashi-gun, Osaka. Manager: T. Inamoto.

Teikoku Motor Manufacturing Co.—Organized to manufacture petroleum motors. Office: 118 Taniyama, Osaki-machi, Shinagawa, Tokyo. Manager: T. Kasa.

Nitrogen Factory, Japan.—For the purpose of purchasing the German patent rights for the extraction of nitrogen from the air, the following interests have combined to furnish the capital:—The Mitsubishi, Mitsui, Sumitomo companies, Mr. Hara and Baron Furukawa.

Yotsudomi Glass Factory.—Organized to manufacture glass bottles and other glass ware. Office: 381 Itchome, Kitadoshin-cho, Kita-ku, Osaka. Manager: S. Yotsudani.

Okutahatanaka Stone Company.—Organized for the handling of building stone and construction materials. Office: 844 Ichioka-cho, Nishi-ku, Osaka. Manager: T. Okuda.

Brickmaking, Mukden.—There are 30 kilns in Mukden operating seven months in the year, exclusive of winter. The larger kilns have a monthly output approximating 100,000 and the smaller ones 50,000, the average annual manufacture reaching about 13,000,000 bricks. The present cost is about \$8.50 per thousand at the kiln. Lack of sufficient capital obliges operators continually to negotiate loans at high interest in advance of the working season, and as a result the returns are often barely sufficient to meet expenses.

Concrete Block Machinery, F. M. S.—The manufacture of concrete blocks, with which concrete houses may be built with speed and economy, is attracting much interest in British Malaya as means of relieving the house shortage. Several municipal bodies are erecting the necessary plant for turning out these blocks.

Arsenal Activity.—The Peking government has telegraphed to the Tehchow Arsenal to manufacture 500,000 rounds of ammunition and to the Hanyang Arsenal to manufacture 5,000 rifles. It is learned that these munitions will be supplied to the Kwangsi-ites.

North-Eastern Industrial Company.—The Chinese-Japanese North-eastern Industrial Company with its main office at Fengtien has been organized with a capital of \$20,000,000. The aim of the Company is to exploit the natural resources of Manchuria and Mongolia. Its field of activities will include mining, afforestation, cereal plantation, etc.

Paper Mill for Ipoh.—A large paper mill is to be erected by several American promoters in the vicinity of Ipoh, British Malaya. The necessary machinery will probably cost over a million dollars. The mill will have not only the local market to supply but an almost unlimited export trade to develop.—*Commerce Reports.*

Siberian Markets.—For the last two weeks local Russian firms in Vladivostok have been receiving letters from American firms inquiring about the local market situation, and the prospects for the sale of goods of American manufacture. The trade depression in the domestic market of America induces the big manufacturers to seek Far Eastern markets for their commodities. Among the goods offered were agricultural implements, lumber equipment, etc. Many companies are willing to extend credit to Russian firms, and, prompted by their desire to sell, they are making very attractive offers.

Cotton Mill Development, Shanghai.—An addition to the long list of cotton mills now in existence is a new plant that is soon to be installed at Pootung, the building occupying 40 mow of land. The mill is to be equipped with 100,000 spindles of Chinese manufacture and the engine and motors have been ordered from a German firm. The mill also plans to install 800 hand cotton gins and twenty to be operated by oxen. Operations are expected to begin during August.

Cotton Spinning in Manchuria.—A cotton spinning and weaving factory has been started in Mukden known as the Spinning & Weaving Company, Ltd., of the three eastern provinces. The capital is \$1,000,000 in 100 shares of \$10,000 each.

Hangchow Satin Weaving.—Within the past ten years the satin weavers of Hangchow have profited enormously by the adoption of foreign weaving machinery. There are now more than

140 weaving mills with 8,400 machines in operation producing an aggregate total of \$16,000,000 worth of satin annually. Besides the chief domestic market of Peking, Tientsin, Canton, Hankow, Shanghai, and Yangtze River points, the satin is finding its way into foreign countries.

Chino-American Engineering Corporation.—The Chinese Engineering and Development Company of Peking has filed articles of incorporation in the United States Court for China here.

The new company is incorporated to engage in general engineering and contracting for building construction and for the production of building materials, its capitalization is G.\$100,000 divided into 1,000 shares of a par value of \$100 each. It is to begin activities with paid in capital G.\$10,000.

The incorporators are: Messrs. S. C. Thomas, Yang Pro-ling and H. A. Raider of Tientsin, Murray Sullivan and Thaddeus C. White of Peking and C. L. Seitz of Shanghai.

New Industrial Enterprises in Shanghai.—Dr. C. T. Wang and Mr. C. C. Nieh, Chinese cotton magnate, are undertaking to organize a dye staff company at a total capital of \$1,000,000 with an American dye stuff company named Heng Sin in Chinese as a joint limited corporation. At the beginning four-tenths of the total capitalization will be paid up, which is to be subscribed by Chinese and American capitalists in equal shares.

A New Filature under Organization, Chekiang.—A model filature, capitalized at \$500,000, is being established in Chekiang. Possibly it will be situated at Hangchow, capital city of Chekiang province. An amount of \$50,000 has been subscribed by the military governor of Chekiang; Gen. Lu Yung-hsiang, and \$150,000 has been subscribed by the local influential personages.

A New Company, Kashing.—A socks and stockings manufacturing company has been lately established at Kashing, Kiangsu, at a capital of \$2,000 by Mr. C. C. Loh and Mr. Y. F. Chang.

Soya Bean Oil for Export: Mills.—Consul Jenkins at Harbin reports that a Chinese manufacturer of soya bean-oil is anxious to get in touch with American oil importers through him, hoping to bring the leading Chinese oil crushers into an export association, with the object of shipping direct to consumers in the United States. There are 32 bean-oil mills in Harbin, with an approximate total of 1,900 presses. Most of the soya bean-oil from Manchuria now reaches the United States by way of other countries.

COMMERCIAL FINANCE

Industrial Investments, Japan.—The Takatus Trust Company, Ltd. recently organized with a capital of Y.2,000,000 at 1 Setomono-cho, Nihon bashi-bu, Tokyo, with Mr. R. Takatsu as managing-director, will make investments in general enterprises.

New Chinese Trust Co., Shanghai.—The first Chinese trust company capitalized at \$8,000,000, is being established by the prominent merchants of Peking, Tientsin, Shanghai and Hankow, Messrs. Sun Mo-han, Ha Han-chong, Li Sung-ching, Li Yung-shu, Chu Pao-san, Yu Yat-ching, Wen Lai-ting and Chow Pei-cheng, at Shanghai. The total capitalization is divided into 160,000 shares and will be paid of which one-fourth has been paid-up.

New Bank for Peking.—A new Sino-Japanese bank, called the Tatung Bank, is to be inaugurated. Ho Hai-min, Lin Jui-teng, Ho Teh-lin and Lin Shih-chen are representing the Chinese capitalists, and the total capital paid up is \$5,000,000.

Restrictions on Foreign Capital.—For the purpose of preventing disputes with foreign governments, the Peking government has just wired to all the provinces stating that without

previous official sanction, no Chinese shall be permitted to use foreign money for the establishment of telephone and electric light companies.

A Trust Co., Shanghai.—A Chinese trust company to be capitalized at \$10,000,000 is being organized at Shanghai by local influential merchants under the leadership of Mr. Yo Cheng-pao.

A Large Corporation Organized by China's Political Potentates.—The three high military commissioner, Gen. Chang Tso-ling, Gen. Tsao Kun and Gen. Wang Chuen-yuen are planning to organize an industrial corporation at a total capital of \$10,000,000, at Tientsin, to take up the work of opening the mineral resources of Chili province.

Peking Starts New Sino-Japanese Bank.—The Tatung Bank, a new Sino-Japanese banking enterprise, with a capital of five million yen, was opened recently at No. 58 Tamochang outside Chienman, Peking. The board of directors consists of the following:—

President: Mr. Lin Sui-shen.
Vice-President: Mr. Ho Hsi-ming.
Managing Director: Mr. K. Koide.
Manager: Mr. Lin Jeh-tsen.

Kyoshin Bank, Japan.—The Yokosuka Commercial Bank and the Kawasaki Kyoritsu Bank, have amalgamated under the name of the Kyoshin Bank, with head office in Yokosuka and 19 branches throughout Japan. Mr. K. Hashikawa has been made managing-director.

New Banks, Peking.—The flotation of the Sino, French Chen-yeh Industrial Bank has been completed and its formal inauguration will take place on the 25th instant at the Culty chambers in the legation quarters. In addition to this bank, another big bank called the Chung-nan Bank, or Central China Bank with a capital of ten million dollars, with its headquarters in Shanghai, has been officially registered in the ministry of finance and its chief promoters are wealthy Chinese emigrants from Singapore, Hongkong and other foreign colonies.—*Asiatic News Agency.*

Report of New Banks.—A new bank, capitalized at a total amount of \$10,000,000 with \$2,500,000 paid-up, was opened on May 28th, 1921 at Peking. This bank is named Tseng Nih, and its managers and sub-managers are Messrs. N. C. Woo and C. C. Hu.

A new bank, capitalized at \$1,000,000, is being organized at Soochow, Kiangsu, by the local pawnshop keepers. Mr. Chen So-kiang, manager of Bank of Communications at Hangchow, will be manager of this bank.

New Bank, Shanghai.—A new bank capitalized at \$2,000,000 was opened at Shanghai on May 31st, 1921. This bank is named Ming Hua, and its head office is at Peking.

Three more banks are being organized. One is named Chung Nan, capitalized at a total amount of \$20,000,000, and to be paid up with \$5,000,000 at the outset; one is named Sin Tung, capitalized at \$500,000; and the third one is promoted by the local cotton merchants being under preliminary preparation.

A New Bank, Tientsin.—A branch of the Industrial Development Bank of China was opened on May 26th, 1921.

A New Bank, Amoy.—An agricultural bank has been lately established at Amoy, Fukien. The total capital of the new bank is \$100,000, and the general manager is the City Magistrate Mr. Lai Yu-ling.

Bank Amalgamation, Japan.—The Yasuda Bank has made a contract with the Kanagawa Bank, Aokicho, Kanagawa, for its purchase and amalgamation. The Kanagawa Bank will be converted into a branch office of the Yasuda Bank in a few days when the contract is formally announced.

Chung Hua Trust Company.—The first one of its kind in Shanghai, planned by Dr. P. Y.

Wang, Chinese delegate to the international red cross conference last year, after his investigation tour in Europe and America, and promoted by many influential personages of Peking, Tientsin, Ningpo and Shanghai, capitalized at \$10,000,000, the chiefs of the preparation committee for the organization of the company are Messrs. Yao Mo-lien and Koo Shing-yih, leading merchants of Shanghai.

GOVERNMENT FINANCE

Harbin-Heiho Railway.—The Manchurian authorities have promised the government that the Manchurian provinces will raise a fund to meet the expenses of the construction of the Harbin-Heiho railway so that there will be no necessity for a foreign loan.

A Loan for the China Eastern Railway.—The ministry of communications is negotiating with the Bank of China and the Bank of Communications for a loan of \$2,000,000 to support the Chinese Eastern Railway. The loan will be guaranteed by the government with the revenue of the railway as security.

The New Loan in the F. M. S.—It is understood that about \$7½ millions have been subscribed to the \$20 million loan.

New Bond Issue Planned: China.—It is learned that Chang Chih-tan, minister of communications, is making preparation for the issuance of \$10,000,000 worth of the Special Treasury Promissory Notes to meet the urgent need of the Government. He points out that \$5,000,000 worth issued by Mr. Yeh Kung-cho were taken up by the Bankers in several days, there would be little difficulty in selling \$10,000,000 if reliable sources of security is offered.—*Jih Pao.*

Loan to Develop Java.—The Dutch second chamber has adopted a bill authorizing the government to raise a loan of 250,000,000 florins at an interest rate of 7 per cent. for the development of the Dutch East Indies.

MINING

Chihli's Mining Resources.—So much opposition among Chinese and foreign investors has arisen since announcement of the formation of the Chihli Construction Syndicate that the government ordered the ministry of agriculture and commerce to cancel the grant of a charter given by the civil governor of Chihli. The new enterprise, which had the civil governor's backing, proposed to monopolize the mining resources of Chihli, which were only recently turned over by the government to the Chihli provincial government.

Stone Quarrying, Japan.—The Mogi Stone Co., Ltd. was organized recently with a capital of Y.250,000, quarter paid up, to quarry and sell stone. Their office is at 2 Kamakura-cho, Kanda-ku, Tokyo, and K. Okazawa is the manager.

Chuhsien Coal Mine.—A rich coal mine is reported to have been discovered in the neighborhood of Yi Shan, near Chuhsien in Shantung province. The coal has been tested and is said to be of a high quality. A company of merchants has been organized with a capitalization of \$500,000 for its development.

Siberia Gold Mines.—The Ordoi gold mines, situated to the west of Blagovieschtchensk, have been leased for a lengthy period to American interests. Negotiations are in progress for the grant of further concessions in the Amur district.

Asa Coal Mining Company, Ltd.—Organized with a capital of Yen 500,000, fully paid up, to operate coal mines in Yamaguchi prefecture. Office: Asa-machi, Asa-gun, Yamaguchi prefecture. Managing Director: Y. Yoshino.

A Coal Deposit Discovered.—Coal has been found at Chiyanchow, Paipuchen, Chihli, and it is reported to be of very good quality. The Peking-Mukden Railway Administration has decided to operate the mine with a capital of \$5,000,000, of which 60 per cent. is to be raised among the merchants. The Administration's ambition is to make the line independent in fuel supply so as to be free from the influence of contractors.

Anglo-Chinese Coal Mining Syndicate.—An announcement is made of an agreement supposed to have been entered into with a British syndicate for the control of the coal rights of the province of Kwangtung, asserts the *Hongkong Daily Press*. In return for the payment of \$1,000,000 in Hongkong currency, in two installments of \$100,000 and \$900,000, and the carrying out of certain conditions specified in the contract, the syndicate, to be known as the Kwang Tung Collieries (Ltd.), was to secure the coal mining monopoly in Kwangtung province for 90 years or more. The agreement provided that the company should be entitled to use any waterways, wharves, ports, railways and other means of transport or storage now existing in Kwangtung province, and also to construct, manage, and superintend and work any other roads, railways, waterways and buildings as may be deemed advisable to the business of the company, upon the payment of reasonable remuneration to any individuals affected by such use or construction. Hongkong is one of the principal ports of the world and coal experts have been investigating the possibilities of laying down cheap and suitable coal in Hongkong.

Langsuan Tin Mine, Siam.—Good progress has been made with the preliminary works in preparation for the installation of the hydraulic pipeline, the survey of the pipe-line track being almost completed. The erection of buildings necessary to house the staff and native labor force is now in hand. A report, with recommendations regarding the pipe-line installation, is expected by the directors by the next inward mail, and this work will be proceeded with without delay.

Iron Mine, Kiangsi.—The richest iron ore fields in the province of Kiangsi are found in the Yungshin district, lying south of Pingsiang, where important collieries are situated. From every picul, the ore yields about 50 to 70 catties of iron. The smelters in the vicinity of these iron fields are said to be doing a good business by purchasing the ore direct from the takings and converting it into small handy slabs. The slabs are then transported down the river and sold to the iron foundries at Kianfu and Nanchang, the capital of Kiangsi, at \$3.25 per picul.

Mine Bureau, Tsitsihar.—Wu Tsun-sheng, Tuchun of Heilungkiang, has asked the government to allow him to amalgamate the afforestation bureau and the gold mine prospecting bureau of Kirin with the industrial department of the province. The cabinet replied that the amalgamation will affect an afforestation loan with Japan and therefore cannot be granted.

Mongolian Mines.—Report have been received recently in certain government quarters in Peking to the effect that the Hutuktu has mortgaged the mining rights of Outer Mongolia to a Japanese syndicate against a loan of \$10,000,000.

Smokeless Coal, Shantung.—A new coal field containing an immense quantity of smokeless coal, some of it equalling the best grades mined elsewhere in the world, has been discovered in Shantung, and is to be worked immediately by a company which employed Chinese and foreign engineers in the exploration. A Chinese business man is now organizing a company with \$500,000 capital to develop the field.

Coal Mines in Yenchi.—Rich coal deposits have been discovered at a certain place adjoining to Yenchi, Hunchun and Chien-

tao, comprising an area of over four hundred square li. According to the Chung Yang News Agency, the quantity of the coal contained in these deposits will be enough for the use of the inhabitants in whole Manchuria for a period of over one hundred years.

Tzehsien Coal Mines.—It has been resolved by the provincial authorities of Chihli that the Tzehsien Coal Mines, hitherto a governmental enterprise, should be converted into a limited company with a capital of \$2,000,000. Preparations for subscriptions, etc. are being pushed on.

Chihli Assembly Mining Concessions.—The Peking cabinet has passed favorably on the request of the Chihli provincial assembly that the central government turn over to the assembly full control over all mines and mining concessions in Chihli that have not yet been taken up. The assembly's petition is now in the hands of the ministry of agriculture and commerce to undergo the formality of that department's sanction.

New Coal Fields, China.—Coal has been found at Chiyanchow, Paipuchen, Chihli, and it is reported to be of very good quality. The Peking-Mukden Railway Administration has decided to operate the mine with a capital of \$5,000,000, of which 60 per cent. is to be raised among the merchants. The administration's ambition is to make the line independent in fuel supply so as to be free from the influence of contractors.—*Bureau of Economic Information.*

Iron in Ural Mountains.—The Ural iron mines have yielded 110,000 poods of pig iron and 15,000 poods of magnesium.

The total output of the Kailan Mining Administration's mines for the week ending 28th May, 1921, amounted to 94,855 tons and the sales during the same period, to 65,706 tons.

The Murata Shoten Company was organized recently with a capital of Y.200,000, quarter paid up, to mine and sell coal. Office: 2 Sancho-me, Shintomi-cho, Kyobashi-ku, Tokyo. Manager: Mr. S. Murata.

The Hokusen Coal Mining Company, Ltd. was organized recently with a capital of Y.1,500,000 fully paid up. Office: 1 Ichome, Yayascho, Kajimachi-ku, Tokyo. Managing Director: I. Kasai.

MINTS

New Coins from Canton.—Work has begun at the Canton government mint in the coining of silver 10 and 20-cent pieces. It is reported that the daily output in silver coins amounts to \$350,000.

To Recast Light Copper Coins at Shanghai.—The general chamber of commerce in Tientsin has voted to redeem the lightweight copper coins now in circulation in that city and to persuade the government to issue special paper currency for that purpose. If the plan is carried out the light coins will be recast into valid money. The coins that have been coming into China from sources unknown to the authorities are two-copper pieces. It is proposed to cast them over into single coppers. The poor are suffering because the coppers are refused by many merchants. While many must suffer somewhat in the process of redeeming the coins at their actual metal value, ultimately all will be benefitted, the merchants believe. The bad coins will not be accepted in trade pending the effort to have them redeemed by notes.

NEW ENGINEERING ENTERPRISES IN INDIA

India Joint Trading Co.—Directors: Hakian Abdul Hari Kham. Office: Jessore. Objects: Manufacturers of bricks, tiles, lime, cement, etc. Capital: Rs. 1,00,000.

Associated Transport.—Registered as a private Company. Offices: 58 Raja Dinendia St., Calcutta. Objects: Conveyance of passengers, goods and general transport. Capital: Rs. 20,000.

West Coast Union Chemical Works.—Mg. Director: V. K. Nair. Office: Cannanore, N. Malabar. Object: Manufacturing of chemicals. Capital: Rs. 1,00,000.

Star Tile Works.—Mg. Propr.: S. Krishnan. Office: Malikaparaniba, Calicut, Madras. Object: Tile factory. Capital, Rs. 2,00,000.

Sri Chandrasekara Industrials (Nellore).—Manager: Dr. M. C. Venkata Rao, Madras. Object: Candle and Soap Factory. Capital: Rs. 1,00,000.

Patna Swadeshi Industrial Co.—Managing Agents: Vaisya & Co., Patna City, Bihar. Objects: Starting new industries in India. Manufacturing, weaving, exporting and importing cloths, yarn, etc. Capital: Rs. 1,25,000.

Assam Transports.—Director: J. C. Maitra. Address: Tezpur, Assam. Objects: Business of motor lorries, taxi-cabs and general agencies. Capital: Rs. 50,000.

Swadeshi Cotton Mills & Co.—Address: Julu, Cawnpore, U.P. Objects: Cotton spinning. Capital Rs. 30,00,000.

Kalol Swadeshi Mills Co.—Managers: Shahi Maneklal Premchandbhai & Co. Address: Kalol (Kadi), Bawder. Objects: Spinning and loaming. Capital: Rs. 5,00,000.

Somnath & Mohanlal Patel's Ginning Factory.—Mgr.: Patel Somnath Jassangbhai Bavla. Address: Dholka, Ahmedabad, Bombay. Objects: Cotton ginning, etc. Capital: Rs. 75,000.

Varendra Rice Mills.—Address: Malopara, Rajshahi, Bengal. Object: Manufacturing and milling rice, grains, etc. Capital: 4,00,000.

Mangalagiri Sri Vuma Maheswara Gin and Rice Factory.—Address: Guntin, Madras. Capital: Rs. 25,000.

Tenali Sri Venkateswara Rice Factory.—Address: Tenali, Madras. Capital: Rs. 29,700.

GENERAL

Sino-Japanese Enterprises.—The Li Chung Company has been organized by the Chiaotung party with \$5,000,000 supplied by Japanese financiers as a Sino-Japanese enterprise. The company will take up among other things, (1) the taking over of the Printing Bureau Loan furnished by the Mitsui Bussan Kaisha firm, (2) the starting of an afforestation company to be known as the Hai Lin Afforestation Company, (3) the taking over of the Wireless Telegraphy Loan from Mitsui Bussan Kaisha and (4) the supply of rolling stock to the Chinese Railways. The old Chiaotung clique has formed another corporation to work in co-operation with seven Japanese companies including the Mitsui Bussan Kaisha and the Okura Co. They will start a coal mining enterprise at Tatung with a capital of \$3,000,000, of which \$1,500,000 will be paid by Japanese capitalists for running expenses while the coal mine property will represent shares to the value of \$1,500,000. It is expected that the mining laws will be modified to meet new conditions created by this coal mining enterprises. These enterprises are regarded as signs of the anxiety of the old Chiaotung clique to extend their influence in order to take the reins of government.

OIL

Exploitation of Oil Reserves of Chinese Turkistan.—It is stated in a recent issue of *Oil News* that the Chinese cabinet has sanctioned the exploitation of the oil reserves of Chinese Turkistan by a company registered under the title of the Chinese Turkistan Petroleum Co., the Chinese name of

which is "Funkungsze." The company is a British undertaking and its English experts have already begun drilling operations in two districts.

Production of Oil by British Company in Dutch East Indies.—It is learned that the annual production of crude oil of the Bataafsche Co. in the Dutch East Indies is 10,000 tons. This company is 90 per cent. British, and of the total quantity produced 2,000 tons go to Holland and the remainder is shipped to England.

Successful Oil Digging.—At Uroyama, Akita prefecture, the Nihon Petroleum Co. produced 150 koku of oil in 24 hours at a depth of 370 ken and at the Katsurade field 130 koku at a depth of 391 ken.

Oil Prospecting, Saghalien.—The work of prospecting the oil fields of Saghalien now in progress by the Nippon Petroleum, Hoden Oil Co., Okura and Kuhara companies is being retarded by the soft earth and other difficulties and orders have been placed for special equipment to cope with these conditions.

Oil-Fields in China.—According to statistical data compiled by Mr. Hsuing Hsi-ling, superintendent-general of oil-fields in China, there are altogether 89 regions in the republic producing petroleum: 22 in Chihli, 4 in Fengtien, 1 in Kirin, 13 in Kweichow, 17 in Yunnan, 8 in Kwangsi, 5 in Kiangsu, 4 in Shansi, 4 in Hunan, 5 in Kiangsi, 3 in Szechuan, 2 in Hupeh and 1 in Kwangtung. Of the above, Chihli, Kweichow, Yunnan, Kwangsi and Szechuan are said to produce an excellent quality of oil.

Yienchang Petroleum Factory, Shensi.—It is reported that one of the three wells of the Yienchang petroleum factory, Shensi, which has made an annual profit of about \$70,000 since 1916, is not in good condition, and the head of the factory is going to Tientsin to invite an American engineer to make investigations.

Standard Oil Co.'s Pursuit of Dutch Oilfields.—According to the *Telegraaf*, two representatives of the Standard Oil Company have arrived at The Hague with a view to obtaining a concession for the exploitation of one-half of the Djambi Oilfields. They express the hope that the Dutch first chamber will refer back to the second chamber the bill dealing with these oil-fields, and that it will be amended so as to give the Standard Oil Company equal opportunities with the Royal Dutch Company.

They point out that the proposed concessions, covering three and one-half million acres, are so extensive that the revenues of the Dutch state would be considerably increased if the oil-fields were exploited on a competitive basis by the Standard Oil and Royal Dutch Companies, instead of by the latter concern alone.—*Reuter*.

Four Large Oil Tanks Building: Hongkong.—Four large oil-tanks are being constructed at the Kowloon Naval Depot. It is expected that it will take several months to complete the work, which involves the laying of oil-pipes and other facilities for the conveyance of oil aboard naval vessels.

The American-Japanese Petroleum Co., Ltd. was organized recently with a capital of Y.500,000, quarter paid up, to do a general business in oils. Office: 4 Ichome, Kakigara-cho, Nihonbashi-ku, Tokyo. Manager: Mr. C. Ozaki.

PUBLIC WORKS

Hakone Roads, Japan.—A national park at the slope of Hakone mountain near the lake is being planned by Dr. Honda who has been entrusted with the work. It is also planned to build several fine roads round the lake.

Construction Engineers, Japan.—Mr. Y. Fukushima has established a business under the name of Fukushima & Company at 1 Yoshinaga-cho, Fukugawa-ku, Tokyo, to handle any kind of construction work.

ROADS

Road Construction in Fukien Province.—The military governor of Fukien province recently commenced the construction of modern roads between Yungchun and Chuanchun, Huyang and Tehua. The roads are being constructed of macadam with a width of 40 feet in the towns and of 25 feet in the country. The actual construction work is being done by Chinese engineers who have had experience in Singapore. It is planned to run a motor omnibus and freight service on the roads when completed.

A Road in Pootung.—An automobile route from Pootung to Chuensa is planned. The route is to start from Chung Ning Temple, Pootung, to the West Gate of Chuensa, comprising a distance of 38 miles. It is expected that the construction will cost Tls. 100,000.

New Road, Japan.—The road between Onsmura and Umemoto, Iyo province, in all about 256 ken, is nearing completion and will cost in all Y.250,000.

New Roads, Japan.—Between Otchome and Rokuchome, a distance of 600 ken, a new road is being built. Pitch and concrete is used.

Road Construction, Japan.—The new road between Uwajiwa-machi and Yoshida-machi, Yehine prefecture, Shikoku has been completed. Its length is 570 ken.

Peking Streets to be Widened.—As a preliminary step towards the construction of a system of tramways in the capital, the ministry of the interior deems it necessary to take measures to widen the different principal streets in the capital through which the tramways will traverse. The metropolitan police have received orders to widen every busy street in the city by ten feet on each side and to fill the gutters that line the streets on both sides.

Street Paving Planned for Tokyo.—It is reported that the work of reconstructing the streets of Tokyo will begin about the middle of this month. Plans for paving the streets have been under consideration for a long time but practically no actual construction has been done. Under the present plans the work will begin at Nihombashi, Uyeno and Kanda. Wooden blocks will be used in the paving and Y.2,000,000 will be spent in this first move toward improving the streets of Tokyo. At the same time the approaches to the Meiji Shrine at Yoyogi will be reconstructed. It is estimated that this work will take two months to complete.

Shanghai-Choling Automobile Road.—An automobile road, about 71 li long and 40 Chinese feet wide, from Shanghai to Choling via Minhang, neighboring towns of Shanghai, will be built. The survey of the whole line has been finished, and a limited stock company capitalized at \$500,000 to run the enterprise has been organized. The construction work will be carried out under the supervision of the engineer, Mr. Y. F. Chow, a native graduated from Tongshan College. After the completion of the work, a regular service of carrying cargo and passengers will be run by 40 common cars capable of accommodating 20-24 persons and several special cars. The cost of the work, including the expense for re-building bridges, purchasing cars and lands, is estimated at about \$220,000, and the inauguration of the enterprise will cost about \$100,000.

Automobile Service Started in Nantungchow.—Regular passenger automobile service has been commenced at Tong-shih, commercial centre of Nantungchow.

Rubber as Paving.—Singapore is to experiment with rubber pavements, and in view of the effect such a use of rubber may have on a depressed industry the venture will be watched with considerable interest. Rubber paving is not altogether new, but it is certainly an innovation in the East.

Tokyo Street Improvement.—The construction of the street from Hihonbashi to Manseibashi is to begin soon. The cost, estimated at Yen 2,000,000, is to be defrayed by an Imperial grant of Yen 1,500,000 and the balance from the national treasury. The wood block program has been discarded for asphalt.

Tokyo Yokohama Road.—It has been decided to widen the width of the new asphalt highway between Tokyo and Yokohama to 12 ken. The removal of houses is progressing and actual construction will commence soon.

Road-Building Schemes.—The Shensi Famine Relief Society is extending its roadmaking operations, continuing the road from Taiyuanfu to Chinssu on to Fenchowfu, thus connecting with the road, built by the American Red Cross, from Fenchowfu to the Yellow River. This will complete a good road from the Yellow River at Hochu to the capital, a distance of over 100 miles. It is planned to macadamize the stretch from Taiyuanfu to Chinssu in the hope that eventually the whole of the provincial motor-roads will be macadamized. Unless that is done, heavy motor traffic will be impossible. Famine labor is to be used for all these projects.

Long Distance Automobile Road in Northern Kiangsu.—An automobile road will be built from Quochow, a small island in the Yangtze River near Yangchow, to Tsinkiangpu, a city in northern Kiangsu on the west bank of the Grand Canal, a distance of about 340 li. Ferry steamer service will also be provided on this line in the Yangtze River.

Road Building in Northern Kiangsu.—Mr. Chang Chien of Nantungchow has undertaken to build an automobile road between Nantungchow and Tsinkiangpu, a distance of about 400 li, connecting with Chinkiang, Hsuechow, Haichow and Pukow to Tsinkiangpu by automobile roads running from 250 li, to 300 li long which are being planned by the local influential merchants—Messrs. S. L. Lu, P. Y. Wang and T. S. Chu. A commencement of the program the Yangchow-Chinkiang automobile road, about 50 li long, will be first built at an estimated cost of \$150,000. The survey of the whole line has been finished and two-thirds of the amount of capital has been subscribed.

Hangchow-Yuchang Automobile Road.—It is being planned to build an automobile road between Hangchow and Yu-hang, a city about 90 li away to the west of Hangchow, by Mr. Koo Tze-tsai and Mr. Wang Ting-shan, natives of Hangchow and Yu-hang. The whole line is being surveyed.

Good Roads Movement: Philippines.—Mr. Forbes, who began the campaign for good roads in the Philippines fifteen years ago, when he was secretary of commerce there, has devoted much time on his trip to an inspection of their present condition. There was much feverish activity on the roads just before the arrival of the mission in Manila, some of them having been completely re-surfaced. Mr. Forbes, however, has made numerous side-trips by motor, and has examined the highways which are off the main line from Manila to Baguio. The results of his investigation have not yet been made public.—*Reuter*.

Propose New Road.—Japanese interests have approached the government with regard to the construction of a railway line from Tienpaoshan to the Tumen River. The matter is now under the consideration of the ministry of communications.

Road Construction.—The ministry of the interior is reported to be working on a plan for a road from Peking to Shanghai. They also report of the organization of a company capitalized at \$1,000,000, gold, to construct a road 130 miles long from Amoy to Foochow, for motor-car traffic. A road from Shanghai to Woosung and to Hangchow, 260 miles in all, is also planned. As part of the famine relief measures, a road is being constructed between Tsinan and Lokow, the Yellow River port.

Motor Road in Canton.—A motor road to the famous Loh Fo Hills is projected by a supervisor of the maritime customs administration at Canton, says the *Hongkong Daily Press*. His suggestion is that it should start from Wang Ka Shan, immediately opposite the city of Sheklung. The local authorities are said to favor the project. It is estimated that the road will cost \$150,000 to construct.

The Tokaido road construction plan was put into effect recently with the commencement of the Namamugi to Rakugo road, a distance of four miles. The plan involves Y.2,800,000.

RIVER, HARBORS, WHARVES AND DOCKS

Manila Port Improvements.—The proposed port improvements of Manila, calling for an expenditure of more than 100,000 pesos will soon come up for serious consideration by the United States government, according to information recently given out by the governor-general's office.

It is stated that a commission, composed of representatives of the American war, navy, commerce and state departments, the United States shipping board, and a delegate from the Philippine government, will be assembled in Washington to settle the question of making Manila the American trade base in the Far East through the construction of additional docks and breakwaters.

Conservancy Works in Anhwei.—The dredging of the Chu-hu River, which flows for about 80 miles through northern Anhwei, has been finished at an aggregated cost of more than \$6,000,000, under the supervision of the Pengpu conservancy works. Similar work is to be undertaken on the Wei River, the main waterway of Anhwei, by the same board.

Tai Hu Lake Conservancy.—For the conservancy works of the Tai Hu lake a sum of \$300,000 has been allocated to Kiangsu and \$200,000 to Chekiang by the Peking government. The work is being carried on by the Tai-hu Lake conservancy board under the directorship of Mr. Wang Tsingmo. As recommended by Mr. Heidenstam, engineer-in-chief of the Whangpoo conservancy board, a small dredging machine at a cost of about \$240,000 will be purchased.

Singapore River Improvements.—Messrs. Coode Matthews, Fitzmaurice and Wilson, have reported to the Straits government, on "Singapore River Improvements." This was reported on by the same firm in 1901 and in 1906, and the chamber of commerce again brought up the subject in 1919. Hence this further report. As engineers, the firm had to supply a scheme, if it were decided to "improve" the river, and they submit a \$15,000,000 plan for building concrete walls on either side, with the raising of the bridges and the strengthening of the abutments. But they are not enthusiastic about it, indeed they damn it with faint praise.

The *Free Press*, commenting on the report, says:—"The Government certainly has no money to spend on a large work of any kind at present, but it would certainly be a mistake to listen to the demands of those who (as a secondary consideration, perhaps) have an eye to the increase in the value of their river shore property, and to support a scheme which, as we read it, stands condemned in the eyes of the firm who make the report referred to."

Rival to Tsingtao.—The latest report concerning the port of Haichow, Shantung, which may be regarded as something of a rival port to Tsingtao, is that reconstruction of the harbor has been decided on by the Peking government, and that a director of the Haichow harbor works office has been appointed in connection with the scheme.

Hulutao, a Commercial Seaport.—The cost of constructing the harbor and other important works for the development of Hulutao, Chihli, as a commercial seaport is estimated at over \$3,000,000.

Conservancy Works in Northern Kiangsu.—The Chuen-yang river is an important waterway in northern Kiangsu, but as it has not been repaired for many years it is in a congested condition. Mr. Chang Chien, director of the conservancy bureau of the Grand Canal, has obtained the consent of the central government to dredge the Chuen-yang river. A new waterway will be dug, lengthening the old river from Cho-shia to Kwuan-yung, the northern coast city of Kiangsu, a distance of about 471 li. The work is estimated to cost \$3,000,000 in all.

Port Improvements at Tsingtao.—Vice-Consul Norwood F. Allman reports from Tsingtao, China, that, according to a statement of the director of the wharves in Tsingtao, the Japanese government has authorized the expenditure of Y.1,000,000 toward the improvement of the Tsingtao wharves, at present greatly overtaxed. This sum will be expended over a period of three years.

Manila Port Improvements.—The proposed port improvements of Manila, calling for an expenditure of more than \$100,000 will come up for serious consideration by the United States government, according to information recently given out by the governor-general's office there.

It is stated that a commission composed of representatives of the American war, navy, commerce and state departments, the United States shipping board, and a delegate from the Philippine government, will be assembled in Washington to settle the question of making Manila the American trade base in the Far East, through the construction of additional docks and breakwaters.

Ramon Fernandez, mayor of Manila, is considered the probable representative of the Philippine government.—*Reuter*.

Bombay Reclamation Project.—In regard to the back bay reclamation scheme of Bombay, the Indian and eastern engineer states that the area to be reclaimed is 1,145 acres, which will be enclosed by a wall 4 miles long, built of stone and concrete. A notable feature of the project is the method by which the actual reclamation will be effected. The total amount of filling required is 27,000,000 cubic yards, or a space 5 miles long, 1,000 yards broad, and 9 feet high. Material will be obtained by dredging the harbor on the east side of Colaba Peninsula and pumping the material through pipe lines across the peninsula into the bay. The quantity of clay filling required is 25,000,000 cubic yards, the remainder, 2,000,000 cubic yards, to consist of topping and hard moorum. It is estimated that the reclamation of 4,000,000 square yards will require an expenditure of £4,000,000, or an approximate cost of £1 per square yard. It is expected that the work will require seven years.

The Harbors of Yokohama, Shimonoseki, Naha and Shimizu will be reconstructed at costs as follows:

Yokohama Y.8,237,000, work to be done between 1921 and 1930.

Shimonoseki, Y.3,610,000, work to be completed by 1927.

Naha, Y.1,500,000, work to be finished by 1925.

Shimizu, Y.5,500,000. This harbor will be dredged to anchor 20,000-ton steamers.

Tachingho Harbor Construction.—With reference to the proposed organization of the Chihli Construction Corporation and the strong opposition of another section of the Chihli people to same, the secretariat of the cabinet has officially written to the ministries of foreign affairs, of the interior, of agriculture and commerce and of communications stating that in order to avoid enquiries or protests from Japan and Britain and possibly other powers, the greatest attention should be paid to the petition of Chihli authorities for the sanction of the scheme relating to the construction of a new port and harbor in the vicinity of the Tachingho river with policing rights because it will be the rival of Tientsin. The question cannot be

decided in the near future because the supporting and opposing petitioners are leaders of equally powerful factions in Chihli, while the latter is also supported by Chihli residents in Shanghai and other provinces. The opponents charge the Chinese promoters of the corporation as second Anfu men who used to bargain away the birthrights of the Chinese people to foreigners chiefly for their own private interests when they were in power.

RAILWAYS

A Railway Loan.—The ministry of communications has negotiated with a British syndicate for a loan for construction of a double-track railway line between Tangshan and Shanhaikuan. The locomotives and equipment of the Peking-Mukden line are being offered as security. The loan agreement has been signed.

The Kirin-Huaining Railway.—Mr. Ono, the vice-president of the Industrial Bank of Japan, who came to Peking to attend the annual meeting of shareholders of the Exchange Bank of China, of which the Industrial Bank of Japan are the principal shareholders, has been negotiating with the ministry of communications over the final stages of the loan for the construction of the Kirin-Huaining Railway. The preliminary agreement was entered into by Mr. Tsao Yu-lin with Japanese interests during Tuan Chi-jui's premiership. It is semi-officially stated that the final agreement has been signed. The railway will run from Kirin through Yenchi and across the Tumen River into Korea.

It is understood that Mr. Ono will also approach the Chinese government regarding the repayment of Japanese loans contracted by the Anfu administration. It is stated that neither principal nor interest on these loans has been met.

The ministry of communications has sent experts to survey the Tsangchow-Shihchiachuang railway with a view to the establishment of a telegraph line.

Kin-Sui Railway Extension.—For the construction of the Suiyuan-Paotou section of the Peking-Suiyuan railway, an agreement has been signed by the railway administration with the Japanese Asiatic Industrial Development Company for a loan of three million dollars. The security for the loan is four million dollars treasury bonds. It is a short-term loan whose proceeds will be solely used for constructional purposes. It has nothing to do with the new consortium because the loan is a local and short-term agreement.

New Railway Companies, Japan.—The Japanese railway department has received applications up to the end of February, 1921, from 98 companies for franchise totalling 1,961 miles of new lines.

Many of these will be rejected, but others, whose names follow, will receive permission:—

	miles
HOKKAIDO.	
Hidaka Colonial Tramway Company	91.75
Uraho Mining Tramway	11.36
NORTHEAST JAPAN.	
Kashiwazaki Tramway Company	23.10
Kariwa Tramway Company	22.00
Senyama Tramway Company	13.00
CENTRAL JAPAN.	
Nippon Electric Tramway Company	296.30
Konan Electric Tramway Company	47.20
Nagoya Electric Tramway Company	39.63
Tenryu Electric Tramway Company	26.09
Tenryu Hydro Electric Tramway Company	33.25
Chita Electric Tramway Company	32.42
Sakawa Electric Tramway Company	39.00
WESTERN JAPAN.	
Ungei Tramway Company	55.40
Chunan Tramway Company	53.70
Geinan Tramway Company	47.28
Imari Tramway Company	12.00
Awa Electric Industry Tramway Company	46.11

Peking-Suiyuan Railway Fengcheng Branch.—The Peking-Suiyuan railway has now announced

that the extension from Fengcheng to Suiyuan is entirely open to both passenger and freight traffic.

Work Recommended.—The construction of the Chuchow-Chuping section of the Canton-Hankow Railway was begun on May 1, as the result of the decision of the government in January last to set aside a portion of the revenues of the Peking-Hankow and other railways for that purpose.

Kirin-Huaining Railway.—The Japanese legation states that the final contract for the Kirin-Huaining Railway Loan has not yet been signed.

Elevated Railway, Tokyo.—The Tokyo *Maiyu* says that the plans for the construction of the elevated railway between Ueno and Manseibashi station are progressing and that the line will be completed in 1923. It will connect the north entrance of the city with Tokyo Station. An area of ground, comprising about 13,000 *tsubo*, has been purchased along the proposed line, and the tenants, numbering 550 families, have been instructed to vacate by September. The construction work is to cost Y.4,500,000, it is said.

The Peking-Suiyuan Extension.—The completion of the Peking-Suiyuan Railway, a line about four hundred and sixteen miles in length, has been announced by the Peking-Suiyuan Railway Administration. The railway authorities have decided that through traffic between Peking and Suiyuan will be formally opened on May first. Construction work of the extension from Suiyuan to Pao-touchen will be commenced before long, as a surveying party under an engineer, Mr. Chow, has already been sent out.

Peking-Suiyuan Loan.—It is reported from Peking that an agreement has been signed with the Japanese Asiatic Development Company for a loan of \$3,000,000 in connection with the construction of the Peking-Suiyuan Railway. The loan is said to have nothing to do with the new consortium, being only a local and short term agreement.

New Railways in the D.E.I.—There is undoubtedly going to be a great expansion throughout these islands in new railroad systems, involving many millions of guilders.

According to all accounts there ought to be plenty of orders to go round without any undue monopolizing, and we have little doubt but that, Dutch, British, American, German, and one or two others will be engaged in this stupendous task which will occupy a year at least.

U. S. A. or German Locomotives.—In connection with the order obtained by a German firm for rolling stock for Java, it is stated in the New York Press that an American manufacturer's bids of \$63,000 and \$60,500 for two types of locomotives compared with German tenders of \$25,000 and \$22,000 respectively.

Canton-Hankow Railway New Cars.—The Wuchang-Changsha section of the Canton-Hankow Railway has received a new shipment of 45 cars from England which will relieve the present congestion of goods traffic. For the Chu-Keng section of this railway between Hunan and Hupeh, the Chiaotungpa has called upon the Peking Mukden Railway, the Peking-Suiyuan Railway, the Peking-Hankow Railway and the Tientsin-Pukow Railway each to contribute a monthly sum of \$400,000 for defraying the cost of the new engineering work undertaken for the section in question. Engineer-in-Chief Cox has recommended the engagement of two additional British engineers to look after the construction of bridges and sub-way in the Southern section of Canton-Hankow Railway.

Southern Section Canton-Hankow Railway.—Again it is announced that work upon the southern section of the Canton-Hankow Railway will be continued, and that a sum of \$120,000 for

this purpose will be provided by the Peking-Hankow, Tientsin-Pukow and Peking-Fengtien railways to commence with, while it is further hoped to raise an annual amount of about \$5,750,000 until the line is completed.

Double Track to Tiehling.—The South Manchuria Railway has been building a double track line to Tiehling. This line is about to be completed soon.

New Railway Started.—Construction work on the branch line of the Peking-Mukden railway from Chinchow to Chowyang is now in full swing. Work was commenced in April, and the section between Chinchow and Yichow will probably be completed by the end of the year. The Yichow-Chowyang section will be commenced at the beginning of next year.

Loan for P. M. Railway.—For the building of the Dahushan-Heishan branch of Peking-Mukden railway, an amount of \$300,000 was borrowed from Ming Yih Coal Mining Company.

The Chefoo-Weihsien Railway.—The technical department of the Chefoo-Weihsien railway bureau reports that road-bed has been completed, and asks for instructions regarding the laying of the rails. The department points out that the railway is urgently needed to develop economic and industrial interests in the region.—*Reuter*.

New Chinese Railway Company.—Three principal points of interest in regard to the construction of a railway from Canton to Hoiping, Kwangtung province, by a Chinese syndicate, are that the railway is primarily a commercial enterprise, that it will have a total mileage of 210 li, or 70 English miles, and that it will traverse some of the richest silk and tobacco producing regions of the province.

Kirin-Tehui Railway.—The construction work of railway between Kirin and Tehui was to have been put in hand early this month, but has been obliged to be put off owing to the shortage of construction materials.

Ssuningkai-Taonan Line.—Work on the construction of the 70-mile extension from Chengchiatun to Paiyintala on the Ssuningkai-Taonan Line of the Chinese Government Railways was started on the return of spring, and has progressed with almost incredible despatch. The whole work promises to be finished before the advent of winter next November. The remarkable quickness of the work is owing to the level stretch of the country, through which the extension runs.

The Nagoya Electric Railway Company has been granted permission by the minister of railways to lay a new line between Inuyama, Aichi prefecture, and Seki Gifu prefecture, 10.35 miles in length.

British and Chinese Corp'n. Loan.—The cabinet recently passed a loan agreement with the British and Chinese Corporation, Ltd., for turning into a double track the distance between Tangshan and Shanhaikuan on the Peking-Mukden Railway.

Chuchow-Chuping Rail Work Started.—The construction of the Chuchow-Chuping section of the Canton-Hankow railway was begun on May 1, as the result of the decision of the government in January last to set aside a portion of the revenues of the Peking-Hankow and other railways for that purpose. The delay was caused by these revenues being used for other and more pressing purposes.

A Chinese Railway Deal.—The following is the outline of the agreement recently concluded between the communications department and the British and Chinese Corporation, Ltd., in connection with the establishment of a double track between Shanhaikuan and Tangshan on the Peking-Mukden Line:—

- 1.—The contracted loan to be £500,000 sterling.
- 2.—The sum of \$166,660 to be delivered month-

ly to the Peking-Mukden Railway bureau by the Hongkong and Shanghai Banking Corporation, beginning on May 17 of the present year.

- 3.—Interest to be 8 per cent.
- 4.—The commission to be 1.5 per cent.
- 5.—The profit of the Peking-Mukden Railway to be appropriated as security.
- 6.—Repayment of the principal and interest to start from June of next year.

Heiho-Harbin Railway to be Built.—The scheme for the construction of the railway line from Heiho to Harbin which has been under consideration for some time, is now decided upon by the Heilungkiang provincial assembly who will raise the necessary capital, amounting to \$6,000,000 by subscription in the form of debentures. The work of construction is to be begun in the Spring.—*Chen Pao*.

A New Railway Line.—Japanese interests have approached the government with regard to the construction of a railway line from Tienpaoshan to the Tumen River. The matter is now under the consideration of the ministry of communications.—*Reuter*.

Railroad Construction: Saghalien.—As early as the autumn of last year the Japanese started making a railroad from Alexandrovsk to Onora to establish communication with Japanese Saghalien. The work is being done by Japanese workmen specially brought from Japan, and the Russians are only employed to attend to horse haulage. In the winter the Russians got remunerative employment in carting stores from Alexandrovsk to Onor, Rikovsk, Timovo, etc.

New Elevated to Cost Y.4,500,000: Japan.—The plans are now complete, says the Tokyo *Maiyu*, for the construction of the elevated railway between Ueno and Manseibashi Station, to connect the north entrance of the capital with the Central Tokyo Station.

For this purpose a tract of land along the proposed railway line covering an area of 13,000 *tsubo* has already been purchased and the tenants numbering 550 will evacuate their houses within the district by September.

The construction work, it is estimated, will cost Y.4,500,000 and will be completed the year after next.

Proposed New Road.—The director of the Shanghai-Nanking Railway has suggested construction of a double line between Pennin and Tanyang. Construction to commence in June next.

New Railway, Saghalien.—A new railway line between Sakaiham and Shikika, a distance of 150 miles, will be built by a newly organized company at Karafuto, Saghalien, for which purpose Y.10,000,000 will be subscribed, half by the promoters and the other half by the public.

SHIPPING

Sino-Belgian Navigation Plans.—The proposal for the starting of a steamship navigation service between China and Belgium has been under consideration for some time, and it is now learned that the waichiaopu and the Belgian legation have lately been in close consultation on this problem. Definite plans and regulations for the new service have been drawn up. The service will maintain two separate navigation routes, six, from Shanghai and Hongkong to Belgium via Singapore, Bombay and Mediterranean Sea, and from Shanghai eastward to Japan, Panama Canal, New York and Liverpool to Belgium. The charter will be registered shortly, and capital for the enterprise has been raised.—*Minkuo News Agency*.

Chinese Ocean-Going Vessels.—A Chung Hua Navigation Co., Ltd. has been lately organized at the capital of Chile by the Chinese residents at South America with a total capital of \$4,000,000. The new company will operate steamers on the Hongkong-Chile run via Shanghai, Honolulu, Mexican, Panama and Peru, and the Hongkong-New York run via Shanghai, Honolulu,

Panama, and Cuba with Chinese-owned vessels and under the Chinese flag.

Steamers Wanted.—Wusih exports large quantities of silk annually. Owing to the lack of transportation several merchants and factories have combined to purchase a few steamships to sail from Shanghai to Wusih for the sole purpose of transporting silk.

Electrically Driven Steamer, Japan.—The first electrically driven steamer the *Biyo Maru* of 5,450 tons launched some time ago at the Asano Dock Yard, at Tsurumi was given her trial trip on May 4 with excellent results. It is expected that other similar steamers will be constructed.

A New Steamer for the Ichang and Chungking Railway.—On June 1st, 1921 a new shallow-draft steamer was launched in the Whangpoo river, built by the Ho Shing Shipbuilding Yard, Shanghai, for the Chinkiang Steam Navigation Company, Szechuan. The hull of the steamer is 135-ft. long and 22-ft. broad, drawing 5-ft. of water, weighing 240 tons in all, having a speed of 13½ knots per hour, equipped with two engines of 1,400 H.P.

Seven More Ships Ordered by America.—It is reported that a certain shipping company in America has awarded another contract to the Kiangnan Dock and Engineering Works in Shanghai for the building of seven more freight steamers.

Dutch E. Indian Fleet.—Efforts are being made in Holland to raise a fund of £20,000,000 for the construction of an East Indian fleet.

The Asano Dockyard Co., Ltd. will construct a new depot ship for hydro-planes to the order of the Navy Dept. She will be about 9,500 tons.

Steamship for Imperial Petroleum Co.—The steamer *Tachibana Maru* was launched from the Harima Shipbuilding Works recently. Her displacement is 8,800 tons.

TRAMWAYS

Besei Tramway Company will build new tram lines between Ichinomiya Machi and Jiu-moku-mura, Aichi prefecture, for which purpose the capital of the company has been increased to Y.2,500,000.

New Electric Cars, Japan.—The electric bureau of Tokyo has decided to run a new type of car between Shinagawa and Osakusa, Ueno, and have instructed the Hamatsucho Factory to draw up plans.

Javan Tramways.—Negotiations are proceeding for the creation of a combine of the Java Tramways with a capital of 90,000,000 gold florins, and if possible with the co-operation of British capital.—*Reuter*.

A Chapel Tramway.—The Nantao Tramway Company has decided upon extending its service to the Chapel district. Contracts are said to have been placed, and the actual work of construction will shortly be begun.

TELEPHONES AND TELEGRAPHS

A New Telephone Between Shanghai and Woosung.—The ministry of communication has sanctioned the application of the Whangpoo conservancy board in stal a long distance telephone between its Shanghai office and the Woosung works. The conservancy will bear the expense of the installation of \$2,795 and pay an annual fee of \$600 to the Chinese Telephone Company in addition to its arrangements with the Shanghai Mutual Telephone Company.

Chochow-Paoting Telegraph Line.—A telegraph military line will be set between Paoting and Chochow, Chili, a distance of about 180 li, as requested by the military governor of Chili, Gen. Tsao Kun, and sanctioned by the ministry of communications.

Shanghai-Nanking-Wuhu Long Distance Telephone.—The construction of a Shanghai-Nanking-Wuhu long distance telephone line has been proceeding since the scheme was ratified by the ministry of communications. Buildings for the centrals at Shanghai and Nanking have been erected—the former at a cost of \$130,000. Poles are being set between Shanghai and Nanking along the railway. The line is expected to be completed in June of this year.

New Telegraph Offices, China.—Telegraph offices have been established at Liu-chen-hsien, Kwangsi, and Kwan-hsien, Shantung, and opened for service.

New Wireless Proposed.—One of the question to be brought before the conference of the presidents of the meteorological observatories in Japan, which is in session now, is a proposal to install a wireless telegraph at the marine meteorological observatory in Kobe which will enable the navigators to reserve the wireless communications on the meteorological conditions, says the *Nichi Nichi*. On the completion of the installment the observatory will report three times a day the changes of meteorological phenomena to ships and vessels on the sea.

U. S. Installs Big Wireless at Peking.—A powerful wireless station is now under construction in the compound of the American legation there. The cost is 150,000 yuan. Its height will be three hundred feet and after completion, direct communication will be commenced between Peking and Washington. The present wireless tower at the American legation is only 175 feet high and communication is limited to the Philippines.

Wireless on Ships.—The *Hongkong Telegraph* states that the Hongkong government is considering the matter of the compulsory equipment with wireless apparatus of vessels registered at, or frequenting, Hongkong. It is probable that a bill will shortly be introduced in the legislative council.

Telegraph Service of Siam.—According to the official report of the post and telegraph department of the government of Siam for the fiscal year ending March, 1919, the telegraph service comprised 7,500,000 kilometers of telegraph lines, involving 10,500,000 miles of wire. There were 230 offices, 83 of which were under the management of the post and telegraph department and the balance under the control of the Royal State Railway. The revenues for that fiscal year amounted to 998,543 ticals and the expenditures to 782,873 ticals, showing a net profit of 215,670 ticals.

Telephone Experiments.—Two examination halls will be erected by the communication department, one in Fukuoka city and the other at Fukushima city at a cost of Y.160,000 where investigations regarding telephones and telegraphs will be conducted.

WIRELESS

New Wireless Plant, Kobe.—A wireless station is being erected at the Kobe Post Office for communication with steamships and is expected to be in service by July. The supporters of the scheme are the Mitsubishi Dockyard, Kawasaki Dock, Yamashita, Osaka, Nippon Yusen and seventeen other marine companies. If this plant gives good results a similar one will be installed at Yokohama.

The Peking government plans to establish wireless stations in Chefoo and Weih sien.

New Tokyo-Kobe Service.—The department of communications is rapidly extending its new construction program and recently decided to add two more wires between Tokyo and Kobe via Osaka.

Wireless Stations Open for Commercial Traffic.—Commercial interests will be interested in the following announcement from Manila:—

The naval radio station at Cavite has advised the bureau of posts that beginning May 1, the

radio circuit between Saigon (Indo-China) and Cavite will be opened for handling commercial traffic between Indo-China and points in the United States, Hawaii and the Philippines.

The rate from radio Cavite to Saigon will be 44 centavos a word and to other points in Indo-China 54 centavos.

Gap Rock, Hongkong, to have a Wireless Equipment.—In view of the urgent need for a resumption of telegraphic communication between Hongkong and Gap Rock, it will be learned with interest that work is now well in hand for the equipment of Gap Rock with a wireless plant, which, when completed, will fulfill the service formerly supplied by the cable.

WATERWORKS

New Machinery for the Chinese Waterworks, Shanghai.—The new machinery for the Chinese Waterworks, Shanghai, ordered from U.S.A., is expected to arrive in June. The installation will take about two months.

Wuchang Waterworks.—New waterworks are to be established in Wuchang, Hupeh. The total capital is \$1,500,000, of which \$400,000 has been collected. Construction will commence shortly.

New Water Reservoir for Dairen.—The construction of a new reservoir at Lungwangtang for the Dairen Waterworks on a five years' program at the total cost of Y.4,600,000 is being hurried forward. It is planned to be 45-ft. deep, and the excavation work has progressed to the depth of 35-ft. It is situated at about five miles from Lungtoun Station this side Ryojun Station on the Port Arthur Branch Line. Lately a light rail line has been laid between the new reservoir and the seashore at Wangchiatun, and all materials from Dairen are loaded in cargo boats or junks at Hama-cho Pier, Dairen.

Waterworks, Ipoh, F.M.S.—During the year contracts were let for preparing two separate schemes for an increased water supply to Ipoh. Reports on these schemes have been received by the government and are under consideration. The present supply amounts to 36 gallons per head of population per diem. Proposals are now under consideration for improving the existing supply and making it accessible wherever it is at present deficient.

Manila Metropolitan Water District!—The metropolitan water district was created by Act No. 2832 of the Philippine Legislature, for the purpose of furnishing an adequate water supply and sewerage service to the inhabitants of the city of Manila and the neighboring municipalities comprising all territory within the boundaries of the city of Manila and the near-by municipalities of Montalban, San Mateo, Marikina, Pasig, Pateros, San Pedro Makati, San Juan del Monte, San Felipe Neri, Calocan, Malabon, Navotas, Pasay, and Paranaque. The secretary of the interior is to have general control and supervision over the corporation.

The corporate powers shall be exercised by a board composed of the mayor, who shall be the president of the board; the president of the municipal board of the city of Manila; the governor of the province of Rizal; the director of public works; and three taxpayers of the district, to be appointed by the governor-general with the consent of the senate.

Pursuant to the law the district board is constituted by the following: Hon. Justo Lukban, city mayor, president; Hon. Ramon R. Papa, president, municipal board; Hon. Andreas Gabriel, provincial governor of Rizal; Mr. Jose Paez, director of public works; Mr. Horace B. Pond; Mr. Felipe Buencamino, jr.; Mr. Vincente P. Genato; and Mr. Jose F. Ramos, secretary-treasurer.

Mr. Abraham Gideon is manager of the corporation and Mr. Francisco Munoz, assistant manager.